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The AUTOMOBILE

Gotham Building 45 Fire Houses

All of Them Will Be Equipped with Motor-Propelled Fire-Fighting Apparatus, Some of Which Is Now Delivered—No Horses Displaced by Present Order or in Near Future

Department Considers Project in Light of Giant Experiment Despite Investment of $700,000 in Equipment—Motorization Is to Come Later

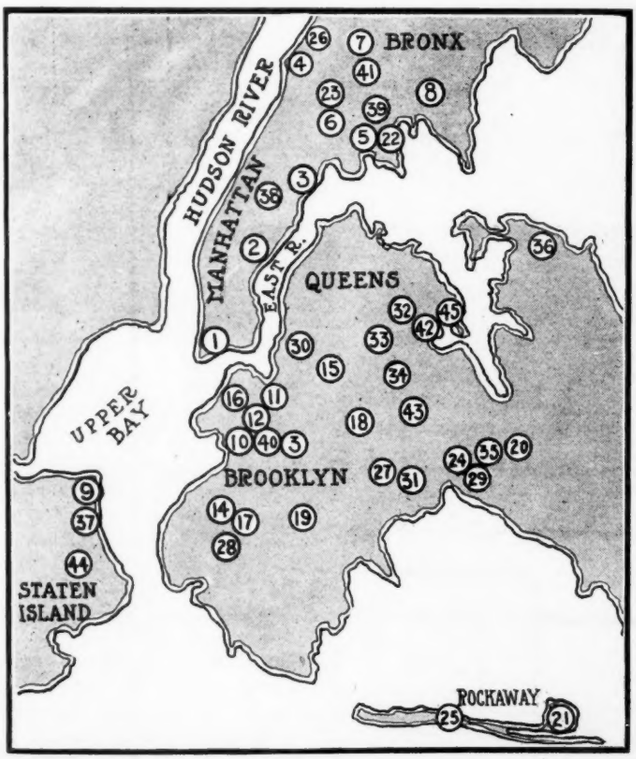
WHEN bids were opened at Fire Headquarters November 26 it was learned that twenty-five out of the twenty-six new aerial trucks which will constitute a part of the fire aparatus to be installed in the forty-two new fire houses had fallen to the American-La France Fire Engine Company in two lots. The other truck went to the Seagrave company.

The trucks will be furnished as follows: Seventeen 65-foot trucks, American-La France Company, at $125,698; eight 75-foot trucks, American-La France Company, $63,152, and one 85-foot truck, Seagrave Company, $8,210.

The other motor-driven fire equipment now contracted for consists of thirty-one combination chemical and hose wagons and high pressure hose wagons, which contract was let July 16 to the International Motor Company, manufacturers of the Saurer, Hewitt and Mack trucks.

The tractor-drawn steam pumping engines will be furnished by the American-La France Company to the number of twenty-eight. This contract was let August 15 and with the above item was chronicled at the time in THE AUTOMOBILE.

All told the expenditure represented by the eighty-five pieces of new apparatus amounts to about $700,000 and the appropriation is just about exhausted. What the future holds in the way of additional thews and sinews, in other words funds with which to buy more apparatus, is in the lap of fate—nobody knows. In a large measure it depends upon the character of the showing made by the new apparatus.



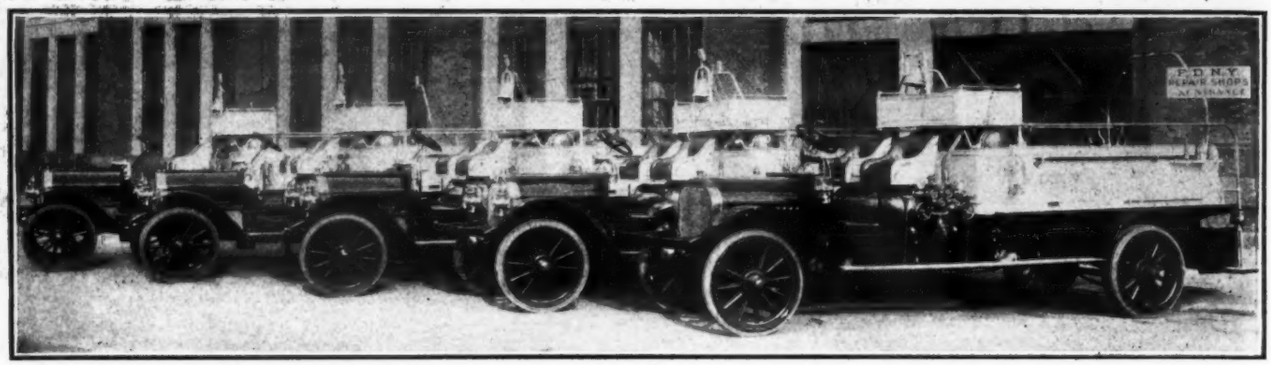
How the new fire houses are distributed in five boroughs of Greater New York, showing twenty-eight on Long Island, three on Staten Island and the rest in Manhattan and the Bronx

New York to date has in service four trucks, two water towers, one gasoline pump, two tractor-drawn steam pumps and eleven hose wagons, all motor propelled. The hose wagons and some of the trucks have been thoroughly tested and have proved satisfactory. They are all installed in houses that used to be occupied by horse-drawn equipment and consequently have been subjected to some disadvantages that will not be laid against the new pieces.

By the first of the year or shortly thereafter, twenty of the forty-five new fire buildings will be turned over to the department for occupancy and the completion of the rest is scheduled for various times during 1913.

Taking up the subject of the houses first and the apparatus afterward, the following description of the New York Fire Department outlines the situation as it is at present.

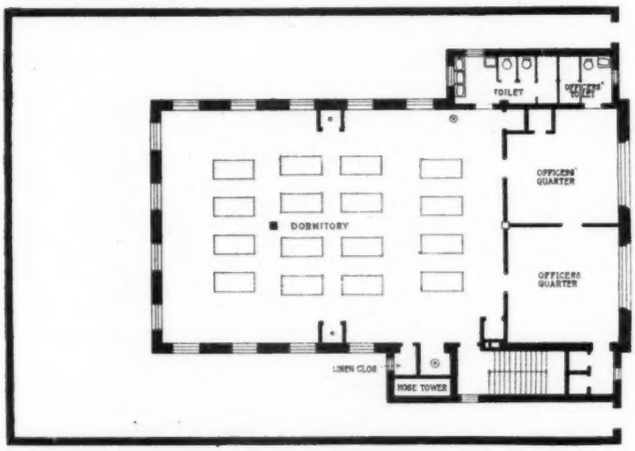
The budget for 1913 calls for $8,945,945, of which about $8,000,000 is for salaries and wages. No permanent additions and im-



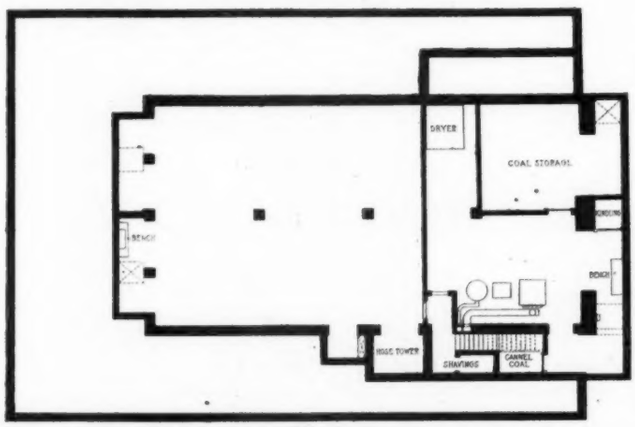
First delivery of combination chemical and hose wagons by the International Motor Company on the present order for apparatus

provements, including apparatus, is considered in the budget and the only item of much importance to the automobile equipment of the department is an item of about $26,000 for maintenance and repairs and another of $12,000 for gasoline. Of course the manufacturers' guarantees provide for certain kinds of replacements, but the item for maintenance and repairs seems inadequate, especially when such a large number of new pieces will be placed in commission during the period covered by the appropriation.

The purchase of fire house sites, building of the houses and their equipment is provided for by the sale of municipal stock and has all been settled. The houses provided under the last sale of stock number forty-five and are located as shown in the accompanying map of New York. Manhattan Island is to have six; Bronx, eight; Brooklyn, fifteen; Queens, thirteen, including two at Rockaway, and Richmond, three.



Dormitory floor, showing sleeping quarters of company



Basement plan of same house, showing storage space

Of these houses forty-two are to be fully equipped with fire apparatus. The other three are to be telegraph and signal stations.

There will be sixty-one full companies stationed in the various houses and some of the houses will have as many as three companies assigned to them.

One fact should be constantly borne in mind in considering the fire department situation in New York. The horse has been displaced in only a very limited degree. The twenty pieces of apparatus now in service displaced horses and the departmental officers who use passenger automobiles in place of the time-honored buggies have displaced horses, but the new apparatus will not take a single job from a single horse.

That is to say, the new houses equipped with motor apparatus will be extensions of the department and not in any sense substitutes of motor equipment for horse-drawn equipment.

If the giant experiment proves to be successful, then the horse will be gradually rooted out until the department is completely motorized.

Of the forty-two fire houses, thirty will be for the accomodation of one or more pumping engines and a truck; four will be occupied by hook and ladder trucks alone and the other eight will house single engine companies.

The total cost to the city will be $2,153,800 and the motor equipment will cost an aggregate of $1,259,000. Of this sum about $700,000 has been covered by the present contracts.

New Houses Last Word in Construction

The new houses have been designed by three firms of architects, Frank J. Helmle, Hoppin, Koen & Huntington and Morgan & Trainer. They represent the last word in fire-house construction and constitute the first attempt of the New York Fire Department to comply with the law covering the storage of combustibles. To the outsider it seems rather strange that the fire department itself, operating a number of establishments that are in legal effect garages pure and simple, should violate the law covering garage construction. This, however, has been the case since the enactment of the combustibles law as applied to New York structures.

In the new houses the law is strictly observed. This point alone caused the department much anxiety, but the plans submitted cover the situation rather ingeniously. The law provides that gasoline shall not be stored within any building where the fumes may come into contact with live fire such as is required to keep up steam in the boiler located below the station of the fire engine. The way the department gets around the difficulty in building the new houses is to provide no direct communication between the basement in which the boiler is located and the apparatus floor upon which the automobile fire engine stands with its tanks full of gasoline.

Thus the openings from the basement are not by stairways to the apparatus floor, but by stairs that open on the street. The arrangement of these stairs cuts pretty close to the letter of the law because when an alarm of fire is sounded it is the duty of every

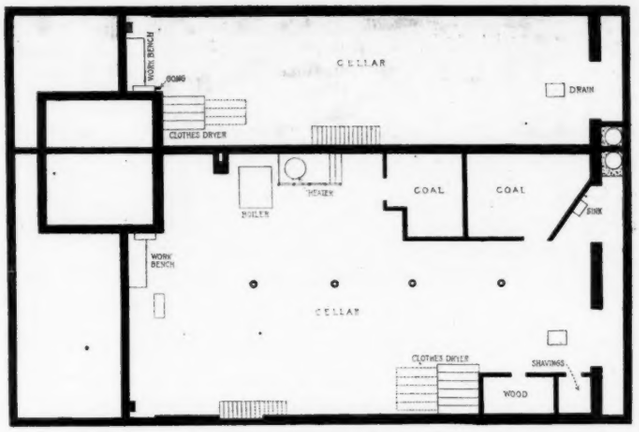
man connected with the company to accompany the apparatus to the blaze. Of course, when men are off duty the rule is modified. Suppose that at the moment an alarm strikes in, one or more of the members of the company are in the basement attending the fire under the boiler or engaged in some other duty. To report to their officers is their first duty and unless they have a handy means of egress from the basement they may be unable to take their places on the apparatus. Excuses and explanations are at a very material discount in the fire department and consequently the architects in framing the plans for the new buildings have provided easy stairways opening toward the front of the house upon the street, so that men caught in the basement at the moment of an alarm can catch the engine, truck or hose wagon as they dart out of the house. At the same time the majesty of the law is not assailed.

As a general thing, the new houses are narrower than houses designed for a similar amount of horse-drawn equipment. The reason for this fact is that the motor-propelled apparatus does not require as much room as is needed for stalls in addition to a similar amount of space for the horse-drawn apparatus. Thus where the department has purchased a number of 50-foot lots the general width of the new double-houses is 42 feet. This means a saving in structural expenses and gives opportunity for better sanitation, more air and added economy in maintenance.

Brick, stone and concrete are used and the various types of buildings now under construction are far more sightly than those in service.

Improvements Embodied in New Buildings

The houses are more compact than those of older styles. The basement and apparatus floors are of cement, the latter being tilted slightly for the purpose of facilitating drainage. The apparatus will be stationed in files. Take the new house on West One Hundred and Eighty-first street as an example. This house is one of the largest under construction and will have five pieces of motor apparatus, not counting the powerful runabout that will be used by the staff officers stationed there. The apparatus will include one of the new aerial trucks, which will be located on the right side of the house, well back from the

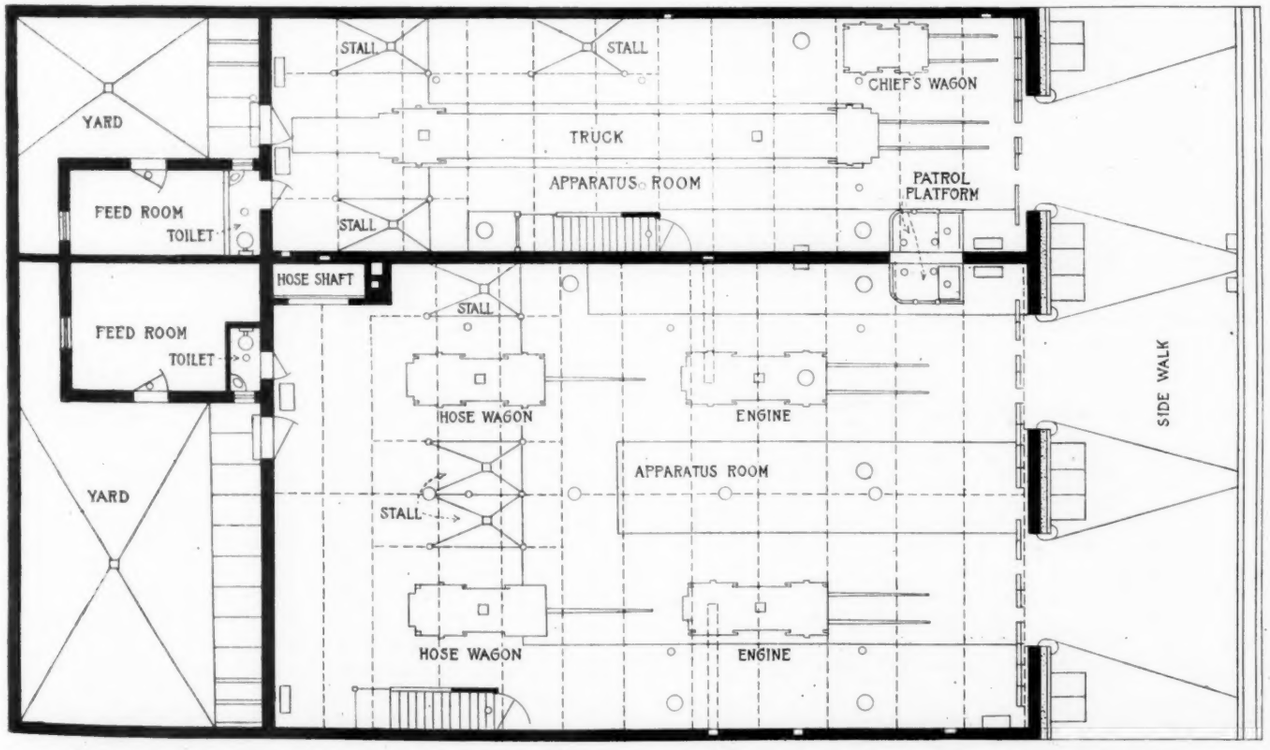


Cellar plan of triple house, near Washington Bridge

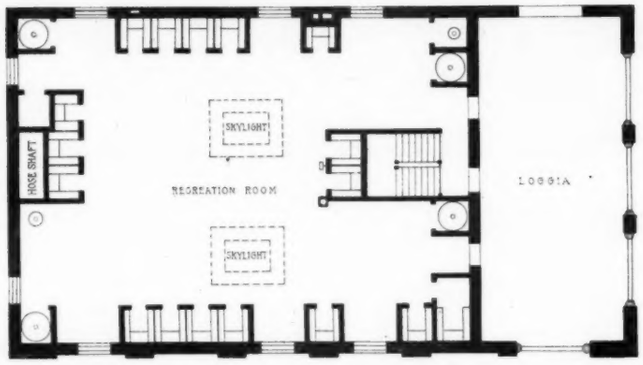
entrance. In front of the truck will be the staff officer's runabout. Poles connecting the dormitories and officers' quarters are to be located in appropriate places near the truck and the runabout. There is no boiler in the basement on the right side of the house, as neither the runabout nor the truck require steam pressure. There are water connections for use in washing down the apparatus and flushing the floors. The middle section of the house will have one of the new American-La France tractor-drawn steam pumps, with poles, water connections and the other paraphernalia. This will be well toward the front, while at the rear will be one of the International Motor hose wagons with its pole and house equipment. Boilers will be placed below the steamers in the basement to maintain pressure when not in use.

The left side of the house will duplicate the middle section. There are to be three doors opening upon the thoroughfare and it has been estimated that the apparatus can be started away within 30 seconds of the time required to determine the location of the alarm box.

The second floor is devoted to sleeping quarters for the men and for offices and quarters for the officers. The officers are



Apparatus floor of Manhattan house, showing stations of six automobiles, five of which will be used for fire-fighting



Recreation floor of a Bronx house, comfortable and open

housed in front and the men in the middle and rear. The poles connecting the dormitory with the apparatus floor are located in such a way that sleeping men can be awakened, slip into their emergency clothing and shoot to their stations in an astonishingly short time. In some of the old houses specially trained companies have been able to start to a fire from deep sleep in a trifle over a minute after the first stroke of the alarm bell, but the average is not nearly so rapid. By the new arrangement it is predicted that this record will be reduced by at least 15 seconds.

The sleeping quarters differ in only small details from the generally accepted practice. The requirement of the law so far as it applies to the number of cubic feet of air space allotted to each occupant of the dormitories has been complied with, leaving a big margin on the side of safety and comfort, despite the fact that the narrowing of the houses has limited the size of the sleeping rooms.

On the other hand, the numerical strength of a company assigned to operate a piece of motor-propelled fire apparatus is less than is required to use a corresponding piece of horse-drawn equipment and therefore the accommodations need not be framed on such broad lines as have been usual in the past.

The upper floor is given over to the recreation quarters. As a general thing the front portion of the floor is finished off as reading and lounging rooms. In some of the houses, particularly those of the very latest pattern, the rear half of the third floor is used as a kind of roof garden. The side and rear walls are not continued to their full height and the space is arranged for rest and recreation of the men.

The third floor is connected with the second and apparatus floors by various means of quick transit from one to the other. There are no poles from the roof garden to the lower floors, but the finished portion of the floor opens with swinging doors to the outside section and men who are enjoying the open air can reach the dormitory floor in case of alarm in 20 seconds or less and be at their stations on the apparatus in 30 seconds. As it requires an average of 40 seconds to receive and identify the alarm numbers, it will be seen that the new houses lend themselves to a high degree of speed in making response.

Manhattan Additions Supplementary

As to the location of the houses it may be said that the new stations on Manhattan Island are either supplementary to the existing horse and motor companies in the older sections or are intended to cover the newer northern sections of the island. The immense house on West One Hundred and Eighty-first street is an example of the second class.

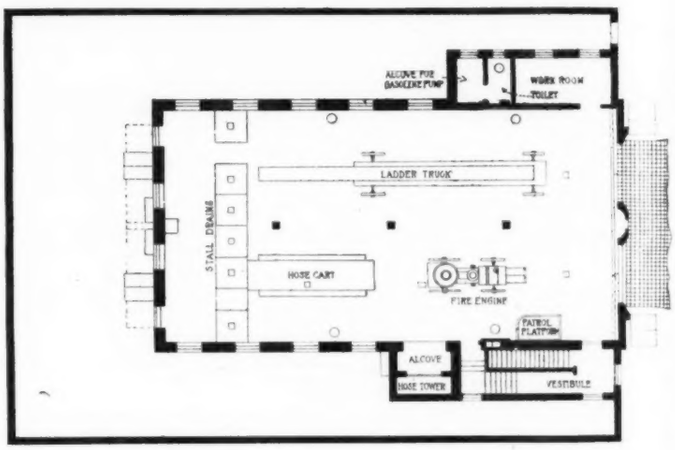
That house is located in the center of a densely populated district heretofore covered by horse equipment in large part. It is directly in touch with the wealthy West Bronx district, using Washington Bridge across the Harlem, and will be available on second call or subsequent alarms from Kingsbridge to Fort Washington and south for 2 miles.

The big hill at One Hundred and Fortieth street is usually considered as marking the division line for fire companies, but under the specifications for the new equipment it will be possible to take the hill and work still further south.

In the Bronx eight new houses are being built. They are purely supplementary to the existing horse equipped stations.

Brooklyn has the largest number of new houses under the present contracts and fifteen stations are under construction in that borough. They will serve the fast growing districts of the borough and supplement the present equipment.

The new houses in the Borough of Queens are somewhat different. Queensboro has an immense territorial area and is poorly covered by the fire department at present. The distances are excessive, particularly with horse-drawn apparatus.



Apparatus floor of typical double house in Queens

A winter fire in Queens, where the property involved or threatened is of considerable amount, is a terror to the department. It has been quite common in the past to answer alarms at a distance of as much as 4 miles. At the very best possible speed horses can cover such a distance, drawing a big steamer, in from 16 to 20 minutes. The average would be considerably higher, probably approximating 30 minutes. The physical exertion of the horses is such that no matter what the weather conditions they are covered with sweat and in a state of exhaustion near collapse upon arrival.

In big Queens fires of the past the loss of horses has been appalling. Also the fire losses have been heavy. Experts in the department say that one 4-mile run to a fire in cold weather is often enough to ruin the usefulness of a good horse, even if it does not serve to end his life. The whole modern theory of fire-fighting is based upon the utmost speed in reaching the seat of action and in Queensboro the territory expanse makes the horse prohibitively expensive and inefficient.

Queens Houses Serve Wide Territory

The new houses are located at various strategic positions where dangerous localities can be reached with concentrated effort in the shortest possible space of time. The companies will occupy single houses as a general rule; that is, the companies will have in charge a single piece of motor apparatus. Like the new houses in the Bronx, the combination chemical and hose wagon will be commonly used in Queens. Of course there will be steamers and a few trucks, but the real effective mechanism that will be installed in Queens is the combination chemical wagon.

The Richmond equipment will be contained in three new houses on the east side of Staten Island. These will be similar in general character to those in Queens.

Aside from the motor equipment now in service and that which has been ordered, the fire department has 182 steamers, 183 hose wagons, 99 hook and ladder trucks and 3 water towers, all horse-drawn. Some of it was manufactured over 30 years

ago, but a large percentage of the apparatus is of the latest and most efficient types.

A tremendous amount of effort is spent to maintain the horse-drawn apparatus at top notch service efficiency, and even the older steamers show by their spick and span appearance and the avidity with which they attack their duties that they have been well kept. But still further, the care that has been expended upon the horse apparatus is an earnest of what will happen when the new motor equipment is installed.

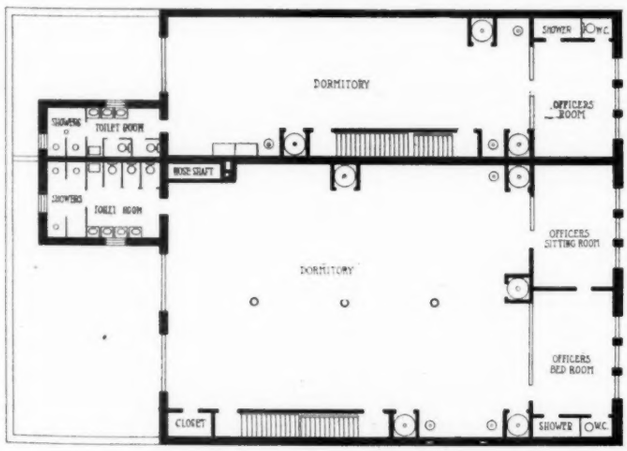
Fire departments have ample labor, money and time to maintain apparatus. On the other hand, the service is exceedingly severe when the call sounds and the factor of safety in the construction of fire engines must be liberal or the life of the piece will be short despite the care and attention that is given to all fire apparatus.

The subject of present and future motor apparatus for the New York department is of the widest importance. The present equipment is actually small compared with the size and importance of New York. Save in a very few instances the apparatus now in service was produced at factories that specialize in fire apparatus and not automobiles. Whether it be a consequence or no of that condition, it is nevertheless a fact that the New York fire department has had an enormous amount of trouble with its motor apparatus so far.

Of course it would be inconceivable to suppose a case where a great municipal department could change from horse-drawn equipment to automobiles without experiencing some sort of trouble and the New York department has had plenty of it.

Department Faced Many Difficulties

The legal regulations that surround the acceptance of any material thing have served to protect the department from money loss on account of the failure of some of the apparatus tendered for test, but those regulations have not prevented a series of blood-letting delays that followed the rejection of certain offered apparatus upon which high hopes had been built. For instance,



Triple company house, showing arrangements for sleeping

a gasoline pumping engine, motor-propelled, was submitted not long ago and according to predictions before the test it promised to revolutionize the whole system of fire-fighting. But the engine failed. It was an excellent automobile but a bad pump, under the rules of the fire department.

Complaint has been made that under the specification framed by the engineering board of the department automobile makers could not participate in the business because the specifications provided for apparatus that was essentially different from the stock product of the companies. Thus, big automobile makers did not bid for the jobs because the specifications provided for a different type of frame, axle, motor, steering gear or other essential or non-essential element not included in their stock product.

This objection might have been just under the old system, but the new apparatus was certainly ordered under about the most wide open set of specifications ever devised for such a big job. That automobile companies did not succeed in getting the whole order must be due to some other reason than that of tightness in the specifications.

An example of this breadth can be seen in the specifications submitted for bids on the thirty-one hose wagons. In the introductory paragraph the following note is published.

"For the sake of clearness it shall be understood that throughout these specifications wherever reference is made to the chassis it is intended to include the assembled automobile in each case without the body of whatever kind and before the finish is applied. It will be likewise understood that the chassis when referred to as such shall not include the mud-guards or the equipment, the latter being enumerated according to custom including lamps, tires, irons, generator, tool kit, registration and rubber tire kit.

"Whenever the body shall be referred to it shall be understood here and after that the mud guards shall be a part thereof and the running boards or steps, of whatsoever kind, shall also be classed with the body, but the mud apron or other protective devices placed to save the machinery equipment and the chassis from harm shall be considered as a part of the chassis.

Specifications of the Wide-Open Kind

"The fire-fighting equipment, as referred to hereinafter, shall include all the fire-fighting apparatus equipment, units or parts related thereto of whatever kind, all of which shall be hereinafter more particularly mentioned and described."

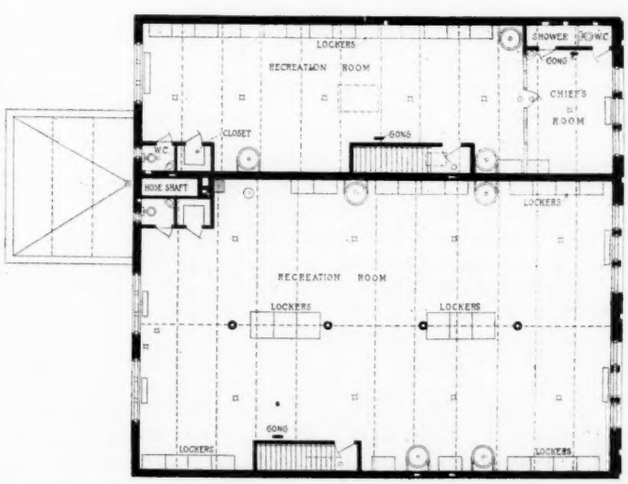
The specifications then go on to enumerate the size, quality and style of the various elements that go to make up the type of hose wagon approved by the department, particularly emphasizing the necessity of following the standards recommended by the Society of Automobile Engineers. In fact the specifications are so worded that the contractor must use the S. A. E. standards under a strict construction.

They are made to apply to the kinds of steel to be used in the various parts to the power plant, specifically providing for a motor with enough power to deliver a maximum of 30 miles an hour with full load and a maintained speed of 20 miles an hour for at least that period; to the frame, engine parts, valves, wheel dimensions and fastenings, tires and all the functional elements of the automobile where covered by the standards.

Throughout the specifications the same spirit prevails and the new hose wagon appeared to be such a thorough automobile under the regulations that the International Motor Company went into the matter with care and landed the whole job.

The first of the hose wagons is due 120 days after the signing

(*Continued on page* 1188)



Chief's quarters and recreation room, same house

Flanders Creditors Meet

Merchandise Men Who Supplied Manufacturing Company with Material Confer About Prospects

Extension of 90 Days Asked—Majority Sign Agreement Giving Committee Power to Represent Them

DETROIT, MICH., Dec. 3—(*Special Telegram*)—Statement of the affairs of the Flanders Manufacturing Company, of Pontiac, Mich., was heard by the merchandise creditors representing 70 per cent. of the total indebtedness of the concern at a meeting held at the Pontchartrain last week. A committee of three was appointed to devise ways and means of continuing the business.

This committee, which was composed of G. W. Rogers, Goodyear Tire & Rubber Company, Akron, O.; S. T. Douglas, attorney for several of the largest stockholders, and W. S. Thomas, Wagnor Electric Manufacturing Company, St. Louis, represented the largest creditors and was instructed to report to a committee of seven composed of creditors next in order of magnitude. The latter was to act as an advisory committee to confer with the directors of the Flanders company.

The Flanders Manufacturing Company has a merchandise indebtedness of $500,000 and outstanding notes to the amount of $350,000, totaling $850,000. Assets including the electric vehicle plant, the motorcycle factory and other holdings of the company amount to $2,135,000. The company's financial difficulties are all through lack of working capital and the indebtedness, only $40,000 of which is held by concerns having credits under $2,000, can evidently be squared away in the event of the closing out of the business. Many of the creditors, however, are of the opinion that by raising about $200,000 it will be able to profitably escape from its difficulties.

The electric car plant has always been a money maker and the other holdings have been responsible for the present lack of working capital.

A meeting of the directors of the company will be held December 3.

A notice of the creditors' committee proceeding was sent to every creditor together with a forbearance agreement which he was requested to sign, thereby agreeing to waive the enforcement of his claim for a period of 90 days unless in the opinion of the committee earlier action was deemed advisable.

To date about 150 creditors out of the 500, besides the principal ten, have signed this agreement which extends to the committee an exclusive authority to act for the signers.

The committee now has control of the majority of the credits and can act with authority when conferring with the directors.

Crude Rubber Advances Slightly

The fortnightly auction in London which began Tuesday saw slightly better prices for the plantation grades, and while the Para grades did not respond, the tone was stiffer all around. The amount of rubber offered consisted of about 750 tons, 25 per cent. of which was from Ceylon. Smoked sheets rose to $1.08 1-2 and pale crêpe to $1.05 1-2. Up-river held its advance of last week after the first auction day, standing at $1.07 1-2.

General Vehicle Expands Capital

Changing the form of its business organization and enlarging its capitalization the General Vehicle Company has been reincorporated under New York laws for $10,000.000, divided evenly between preferred and common stock. The company has always been more or less of a close corporation and its character will not be changed by the new move. The present stockholders will be offered the option of taking the new issue, or as much of it as shall be issued at par. The present capitalization is $1,000,000.

The reasons for the increase are that the company requires more liquid capital to finance its plans for the immediate future. These plans include the installation of a huge factory for the manufacture of Mercedes trucks and also another large factory for the making of electric vehicles. The foundation of the new six-story building at Long Island City is completed.

The General Vehicle Company has been ultra-conservative until recently when it branched out into the gasoline field. It has been tentatively announced that there will be some additions to the present line of electrics and possibly some changes in the roster of officers.

W. C. & P. Leaseholds Sold

Leaseholds on the property occupied by Wyckoff, Church & Partridge, Inc., at Fifty-sixth street and Broadway, including the garage and supply store, have been sold by order of the United States District Court to H. M. Swetland, for the Swetland Operating Company. It is understood that negotiations are under way to transfer the property to a garage and selling concern, or to an operating company.

On Saturday the transfer of the property to the purchasing syndicate consisting of Messrs. Ellis, Griswold and Dickinson

Automobile Securities Quotations

Movements in the list of automobile securities during the past week were irregular. Some advanced; some stood still and some declined. Trade was not impressive in volume and the fluctuations resulted from the preponderance of buying or selling orders in a small market. Firestone was the strongest element in the list, scoring a rise of 13 points. Goodyear failed to hold its extreme advance to 450 and fell back 10 points on some small sales for profit taking. There was ample margin for such operations, as the stock has advanced $200 a share, practically without a setback. American Locomotive preferred rose sharply $4 a share, while General Motors, Goodrich, International and Studebaker sagged. The preferred issue of International broke rather sharply and on Tuesday showed a loss of $7 a share.

	1911 Bid	1911 Asked	1912 Bid	1912 Asked
Ajax-Grieb Rubber Co., com	..	..	180	191
Ajax-Grieb Rubber Co., pfd	..	..	99	101
Aluminum Castings Co., pfd	..	..	98	100
American Locomotive Co., com	35½	36	46	46½
American Locomotive Co., pfd	102½	103	107	107½
Chalmers Motor Company	..	..	125	145
Consolidated Rubber Tire Co., com	7	11	11	14
Consolidated Rubber Tire Co., pfd	10	20	50	60
Firestone Tire & Rubber Co., com	175	180	303	310
Firestone Tire & Rubber Co., pfd	107	109	105½	107
Garford Company, preferred	..	..	101	102
General Motors Company, com	37½	38½	37	38½
General Motors Company, pfd	77	79	77⅞	79½
B. F. Goodrich Company, com	..	..	69½	70
B. F. Goodrich Company, pfd	..	..	106½	107
Goodyear Tire & Rubber Co., com	235	240	440	445
Goodyear Tire & Rubber Co., pfd	104	106½	104½	105½
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	17	20
International Motor Co., pfd	..	..	67	71
Lozier Motor Company	..	..	..	45
Miller Rubber Company	..	..	150	153
Packard Motor Company, pfd	104½	106	105½	106½
Peerless Motor Company	..	..	115	120
Pope Manufacturing Co., com	40	44	27	29
Pope Manufacturing Co., pfd	66	68	70	71
Reo Motor Truck Company	8	10	9	9½
Reo Motor Car Company	23	25	20	20½
Rubber Goods Mfg. Company, com	85	95	100	..
Rubber Goods Mfg. Company, pfd	100	105	105	108
Studebaker Company, common	..	..	41	42½
Studebaker Company, preferred	..	..	93½	94
Swinehart Tire Company	..	..	100	100½
U. S. Motor Company, com	*1/16	*⅛	†‡8	†‡10
U. S. Motor Company, 1st pfd. (new)	..	..	65	70
U. S. Motor Company, com	*1/16	*⅛	†‡8	‡10
U. S. Motor Company, pfd	*¼	*½	†§30	†§35
White Company, preferred	..	..	105	108

*Old. †New. ‡Common. §2nd preferred.

was completed. The syndicate acted as intermediary between the receiver and the Swetland Operating Company as the leasehold involved was a part of the bankrupt estate included in the terms of purchase.

No further developments as to the new corporation to succeed W. C. P. have been reported and announcement has been made that while the preliminaries are finished, no outline of its scope and plans will be made until next week.

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INTERNATIONAL COMMERCE will make a new high mark when the figures for 1912 have been compiled covering the foreign business of all the nations on earth. Present indications point to at least $35,000,000,000 as the gross amount. This compares with $31,000,000,000 last year and represents an increase of 100 per cent. in 22 years. Foreign business in automobiles is reckoned at about $50,000,000.

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PONTIAC, MICH., Dec. 2—A. C. Leverton, formerly with the Brush Motor Company, Detroit, has been appointed general manager of the Cartercar company, succeeded J. J. Hartley, who has been transferred to Philadelphia. A. Lehr, recently with the Studebaker Corporation, has succeeded H. D. Evans as purchasing agent, while W. D. Block, of the General Motors Company, hereafter will be comptroller of the Cartercar plant. E. J. Farkas, engineer of the Cartercar, has left and has opened offices in Detroit.

Market Changes of the Week

Despite the fact that the past week was short, due to the holiday which fell on Thursday, it may be said that considerable activity reigned in practically all the quarters of the materials market, although the effect is not apparent from the price tabulation in every case. In the metal market, for instance, the quotations of steel remained unchanged, although a number of important orders were reported by the leading companies. Copper met a fair market, and save a fractional decline in electrolytic remained unchanged. Tin advanced $4 a ton, while lead fell off $3.

Coming to the lubricants and kindred products, the most important development was the advance of 5 cents per barrel of Pennsylvania crude oil, which is said to be due to the continued strong demand for this type of natural fuel. Other materials in this department, including linseed and rapeseed oil, suffered declines of their prices, whereas cottonseed oil proved very strong throughout the week.

Rubber was rather inactive during the week, but the tone of trading was firm most of the time. The price of $1.07 per pound of fine up-river Para remained unchanged during the week.

Material	Wed.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, per lb.	.08⅞	.08⅞	.08⅞	.08⅞	.08⅞	.....
Beams and Channels, 100 lbs.	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, ton	27.50	27.50	27.50	27.50	27.50	.....
Copper, Elec., lb.	.17⅜	.17⅜	.17⅜	.17 4/	.17 1/10	—.00 3/10
Copper, Lake, lb.	.17½	.17½	.17½	.17½	.17½	.....
Cottonseed Oil, Dec., bbl.	6.20	6.15	6.27	6.24	6.27	+.07
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals. @	.21	.21	.21	.21	.21	.....
Lard Oil, prime	.96	.96	.96	.95	.96	.....
Lead, 100 lbs.	4.50	4.50	4.50	4.45	4.35	—.15
Linseed Oil	.52	.52	.52	.50	.50	—.02
Open-Hearth Steel, ton	28.00	28.00	28.00	28.00	28.00	.....
Petroleum, bbl., Kansas, crude	.76	.73	.76	.76	.76	.....
Petroleum, bbl., Pa. crude	1.85	1.85	1.85	1.90	1.90	+.05
Rapeseed Oil, refined	.70	.70	.70	.69	.69	—.01
Rubber, Fine Up-river Para	1.07	1.07	1.07	1.07	1.07	.....
Silk, raw Ital.	....	....	....	4.37½	4.35	—.02½
Silk, raw Japan	....	....	....	3.82½	3.87½	+.05
Sulphuric Acid, 60 Beaumé	.90	.90	.90	.90	.90	.....
Tin, 100 lbs.	49.50	49.40	49.50	50.00	49.70	+.20
Tire Scrap	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.....

N. A. A. M. Car Bureau

Detroit Branch Will Strive To Keep in Touch with Automobile Freight Cars When Away from Home Lines

Peak of the Load Apparently Was Passed Earlier Than Usual and Shortage Is Slightly Less

THE National Association of Automobile Manufacturers has installed its service bureau at Detroit, according to announcement made by James S. Marvin, traffic manager of the association. The purpose of the new bureau is to facilitate the efforts of automobile makers to secure a supply of freight cars during the shipping season. The methods to be used will be largely precautionary. For instance, when a shipment of automobiles leaves the manufacturing center, the numbers of the cars are listed, together with their ownership and official designations. This list is forwarded to the railroad which will make delivery of the freight, with a letter requesting the terminal road to protect the cars and to see that they are promptly returned to the railroad from which the shipment originated.

A system of daily car reports has been instituted which will show the location of automobile freight cars, and thus tend to decrease demurrage and delay.

It has been found that fully 30 per cent. of the inefficiency of automobile freight cars arises from the withholding of foreign cars by terminal railroads under the present unsatisfactory system of demurrage. The association hopes to decrease this percentage to a material extent by the operation of the car service bureau.

The freight car shortage has turned the corner and a quick recovery to normal conditions is looked for in the traffic world. The peak of the load was passed about November 18 and the fortnightly tabulation issued by the American Railway Association covering conditions up to November 21 shows that the net shortage for that period was 51,112. As compared with the preceding report, this shows a lessening of the shortage by fifty-seven cars.

As an evidence of the strenuousness of the situation it may be said that at the corresponding period of 1911 there was a net surplus of freight cars amounting to 23,110. The peak of the load, however, was not passed in 1911 until a considerably later date.

The box car situation improved to a marked extent, the shortage decreasing from 44,000 to 38,465, and as the automobile industry is interested in the supply of a certain type of box cars the announcement has been well received. The greatest increase in the shortage was noted in the supply of coal cars.

The recent storms have not served to check the movement of grain and other agricultural freight which still continues in unprecedented volume. During the past 10 days, however, signs have developed indicating that the movement is due for a check in the near future.

Grain Moving Is 1912 Crop

Reports have been circulated that the grain that has formed the bulk of the movement so far is largely from the 1911 crops. This, however, is not borne out by investigation, as it is well known that the high prices of last spring caused the farmers to ship their grain and left the barns practically bare before the bumper crop of 1912 was harvested.

Orders for 13,500 cars were placed during the past week by the granger railroads serving the Middle West. Inquiries for 30,000 cars were made by other roads during the week. The Santa Fé and St. Paul roads contemplate spending $20,000,000 for cars and equipment in the immediate future.

Accidents of the Year On New York Streets

Vehicular Traffic Cost Lives of 486 Persons on Highways and Byways of Metropolis

Report Covering First 11 Months of 1912 Shows Total of 2710 Persons Killed or Hurt, Half By Automobiles

ACCORDING to the report covering the first 11 months of 1912, issued this week by the National Highways Protective Society, of which Colonel Edward S. Cornell is active head as secretary, vehicular traffic accidents in New York City since the first of the year have been reported as follows:

Kind of casualty	Killed	Injured	Total
Automobile	201	1260	1461
Trolleys	121	667	788
Wagons	164	297	461
Total	486	2224	2710

Of the automobile fatalities ninety-three were children under the age of 16. Many of the cases reported were those of children skating or playing in the streets. The operation of toy wagons and pushmobiles was another source of accident. These two factors in the situation indicate that lack of adequate playgrounds for the children is accountable for at least fifty of the fatal accidents. It may be noted that one of the objects of the National Highways Protective Society is to secure adequate playgrounds.

But the fundamental protest raised by the society is against the reckless and illegal driving of a certain class of automobile owners and a certain class of chauffeurs.

Col. Cornell holds that when a fatality occurs, the license of the driver should be suspended automatically and that it should be reissued only upon due cause being shown for such action.

"The difficulty," said Col. Cornell, "lies in the single fact that certain owners and certain chauffeurs feel that they must exceed the limits of the law, good taste and good sense in order to attract attention to themselves and their cars. It is perfectly sure that the man who has owned high-grade automobiles since the beginning of the industry will not take undue chances and it is equally sure that the man who saves $1,000 and buys a car for the use of himself and family will be cautious and law-abiding in its operation. But the man who suddenly achieves wealth and who loses his perspective of life and the rights of others is the fellow who is a menace to the automobile as well as to the general run of citizens."

In referring to the chauffeur, Col. Cornell said that greater care should be used in granting licenses, but that such care would be useless unless some more stringent measures were used in preventing second offenses. He cited the situation in Connecticut to illustrate his point.

"During the past year," he said, "there have been eighty-six licenses revoked in Connecticut, thirty-four of which were held by owners of cars. Needless to say that casualties in Connecticut are not so numerous as they are in New York, despite the fact that the automobile law is more liberal in many respects than it is here.

"There is one thing upon which we can congratulate ourselves, however. Not a single non-resident of New York has been killed on the streets this year. The reason for this state of affairs is simple enough when one comes to look a trifle under the surface. For instance, when a resident of Prunty Corners starts for a trip to New York, his wife will caution him at the front gate, saying: 'Now, John, you know how fast the taxicabs run in New York and how crowded the streets are, so do be careful John.'

"And of course, John is careful. That helps some, but the curbing of reckless driving and the provision of playgrounds for the children will do more. Accidents will always happen so long as man is a finite creature but their number can be reduced by a general, decent regard for the other fellow's rights."

Among the fatalities tabulated above there was one in November where a horse car ran over and killed a child. This will probably prove to be the last accident of that kind in the city as the last of the horse cars will be seen soon.

In New York state eighty-nine persons were killed and 123 injured in grade crossing accidents. A large part of this appalling list resulted from the running down of automobiles on crossings. During the period of 11 months, forty-seven cars were struck and fifteen persons were killed. The society is opposed to grade crossings and is constantly doing a lot of active work to eliminate them by law. Of all the accidents on the list those at grade crossings appear to have the least basis of excuse or explanation.

According to the report the vehicular accidents in Vienna during 1911 resulted in sixty-four deaths and the injury of 2,169. Of these, the automobile fatalities numbered twenty-four.

In Berlin the vehicular fatalities were 129, of which those charged to automobiles numbered twenty-eight.

In Paris 236 were slain in 1911, of which 103 were charged to automobiles.

In London 410 met death in vehicle accidents and 262 were charged to automobiles and motor busses.

In 1911 the report shows that 417 persons were killed by automobiles in London, Paris, Berlin and Vienna and that in 11 months of 1912, 201 persons met death in New York City through the same means. Carried out for the full year, the estimated casualties by automobile in New York City will be about 220.

French Exports Increase $8,000,000

PARIS, Nov. 23—For the first 10 months of the present year France exported automobiles to the value of $34,709,280, compared with $26,443,800 for the corresponding period of the preceding year. Increased business was done with all nations with the exception of five—Italy, Turkey, Russia, Austria and Switzerland.

The total value of foreign cars brought into France is $2,245,800. America is responsible for practically the whole of the increased imports. The official returns for the export of automobiles from France for the first 10 months of 1912 are as follows:

Country	1911	1912
Great Britain	$8,591,880	$9,537,600
Belgium	4,981,980	7,966,140
Algeria	1,906,980	3,052,980
Germany	2,204,040	2,698,560
Argentine	1,345,680	2,314,600
Brazil	972,900	1,716,960
U. S. A.	474,120	857,820
Spain	501,000	808,560
Switzerland	922,620	769,020
Italy	760,320	445,140
Russia	449,880	382,840
Austria	380,880	174,780
Turkey	284,400	120,660
Other countries	2,661,180	3,861,600
Total	$26,443,800	$34,709,280

Exports Take Another Big Jump

WASHINGTON, D. C., Dec. 2—According to a preliminary report of the bureau of Commerce and Labor, exports of automobiles and parts for October amounted to $1,583,812 and for the first 10 months of the calendar year, $19,836,111. The comparison between 1912 and 1911 is as follows:

Exports	October	10 months
1911	$1,043,093	$12,608,127
1912	1,583,812	19,836,111

Imports during October included seventy-eight automobiles valued at $170,410.

Northway Bids High for Ohio Property

Officers of New Concern Offer Top Price for Assets of the Embarrassed Factory Plant

Court Orders Sale Consummated Upon Deposit of $30,000, Making the Full Settlement with Mortgage

CINCINNATI, O., Dec. 3—(*Special Telegram*)—That the Northway Motor Company, headed by Ralph Northway, formerly prominent in Detroit motor circles, will take over the $1,000,000 assets and property of the Ohio Motor Car Company at Carthage, was definitely settled today when Receiver Edward Schultz, of the Ohio Motor Car Company reported to Common Pleas Judge Cushing that the best bid received by him for the assets of the concern was that made by William Pabodie, of Hartwell, and Ralph Northway now of Wyoming, O., who offered $60,000 as a lump bid. They agreed to pay $5,000 cash down to bind the sale, and to give a $25,000 mortgage on the plant and $30,000 additional cash when the sale is ordered. Judge Cushing ordered that the sale be made and it will be confirmed as soon as the remaining $30,000 is deposited.

Pabodie and Northway represent the Northway Motor Company, recently incorporated under the laws of West Virginia, with a capital stock of $600,000, and it was for this company that the purchase was made. Mr. Pabodie stated today that the new company will manufacture motors, this being the main part of the company's industry, though it will continue the manufacture of the Ohio car, the automobile which was put out by the Ohio Motor Car Company. The plant, valued at nearly $1,000,000, controls 10 acres of ground, about 3 acres of which is now under buildings but the new company expects to have to increase the accommodations within a short time.

Mr. Pabodie stated that the company will start in as soon as the court matters are settled and that it already has some 8,000 orders on hand. Mr. Northway will be the president and general manager of the new concern.

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CINCINNATI, O., Dec. 1—Cincinnati is to have a new company to manufacture automobiles. The Northway Motor Car Company, which was just recently incorporated in West Virginia, with a capital of $600,000 will begin to produce here about the middle of December. The Chamber of Commerce is now making an effort to find a suitable location for the company. It is said that if this cannot be accomplished, an entirely new structure will be erected. Ralph Northway, of Wyoming, O., formerly connected with a large automobile firm in Detroit, will be at the head of the corporation. W. D. Furste, Edward Deckebach, of Cincinnati; F. W. Enslow, of Huntington; William Pabodie, of Hartwell, O., and Ralph Northway are the incorporators.

It is planned to employ 200 men at the beginning. No name has been selected for the car. At first it was rumored that they would take over the Ohio Motor Car Company at Carthage, O., but that concern seems to be getting along pretty well under the hands of a receiver, who, it is expected, has not very much longer to fill in at that position.

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Electric Men Discuss Operative Costs

Several hundred electric vehicle men attended the meeting of the Electric Vehicle Association of America which was held at the Engineering Societies' Building, 29 West Thirty-ninth street, on Tuesday evening, November 26. Arthur Williams of the New York Edison Company, the new president of the association, presided for the first time in his new capacity.

The greater part of the evening was spent in a discussion of the papers which were read at the third annual convention held in Boston in October. In one of the papers dealing with the cost of electric vehicle operation it was stated that a 1,000-pound wagon effected a saving of $400 a year over a 1,000-pound horse-drawn vehicle, and that a 5-ton electric truck effected a saving of $1,100 a year over horse equipment capable of doing the same work.

President Arthur Williams stated that the New York Electric Vehicle Association will probably soon take its place as a section of the Electric Vehicle Association of America.

A standard design for an official garage sign was adopted. It consists of white letters reading "Electric Vehicle Charging" on a blue background, with the emblem of the association in the center. The sign is to be 4 feet long and 2 1-2 feet wide. It will be sent to garages everywhere in the United States which have electric vehicle charging stations.

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Southern Roads Would Raise Rates

The meeting of the Southern Classification Committee will be held in Washington this week, and among the subjects that will be considered will be the contemplated changes in the classification of automobiles shipped over Southern railroads. The plan proposed by the railroads is to raise the classification of automobiles to double the present rates and to cut down the minimum car load requirements to half the present weights.

If adopted, the new rule would work a big hardship on the automobile shippers. As an illustration of its working it may be said that where, for instance, the rate applying between certain points is $1 per 100 pounds with a minimum weight per car load of 10,000, the cost of shipping an automobile weighing, say, 7,000 pounds would be $100. This is reckoned on the minimum weight at full tariff. If the classification shall be raised to double first-class, or, say, $2 per 100 pounds with a minimum weight requirement of 5,000 pounds, the shipper would have to pay $140. Of course, if the automobile weighed only 5,000 pounds or less the cost of shipment would be the same as it is at present.

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Studebaker Sued on Flusher Patent

Suit has been entered in the United States District Court by the St. Louis Union Trust Company, as assignee of the Ottofy patent 795,059, covering a street flushing device which may be motor-propelled, against the Studebaker Corporation, charging infringement of the patent and asking for an injunction, accounting and damages.

The Ottofy patent has been adjudicated in an action in the Eighth Circuit of the United States Circuit Court of Appeals and held valid.

According to the bill of complaint, the defendant company has made a large number of street flushers which are alleged to infringe the patent in suit.

The Studebaker Corporation has until the January Rule Day to put in its appearance and its defense will develop later. The amount involved is said to be material.

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Mercedes Radiator Patent Sustained

LONDON, Nov. 24—Justice Joyce has rendered an opinion in the suit brought on the Mercedes British patent 3235 covering a type of automobile radiator, against the Fiat Cab Company. The decision supported the patent. An injunction was granted by the court, but a stay was granted pending application for appeal. Under the British law it is customary when infringement has been found against a defendant to have the decree so framed that the infringing devices must be yielded up for destruction. In this case the Fiat Cab Company has several thousand cabs in service. The order of destruction has been stayed along with the injunction.

A. A. A. Is Flourishing

All Bills Paid and $3,293 in Treasury—Enos Succeeds Hooper as President—Chairmen Appointed

Rincon Road Opened by Automobile Run—H. W. DuPuy President of Pennsylvania Rubber Company

CHICAGO, ILL., Dec. 3—The annual meeting of the American Automobile Association, held for the first time in many years in the West, was interesting which was marked by only one fight—the Ohio clash. It also saw the retirement of Robert P. Hooper, of Philadelphia, as president, and the installation of Laurens Enos, of Buffalo. The national organization was shown to be in a flourishing condition, with $3,293 in the treasury and all bills paid, while the good roads cause was given the expected boost.

When William Schimpf, chairman of the contest board, took hold of the office there was a deficit, but he was able to turn over $5,000 to the treasury, report all bills paid and a small surplus in his bank. The board granted 132 sanctions. Twenty more tracks than ever before were licensed and the number of meets held during 1912 has been a record-breaker. There were ninety-four. In 1911 there were only fifty-two and in 1910 seventy-two. Nineteen of the 1912 dirt track meets were on 1-mile tracks and twenty-two on 1-2-mile ovals.

Not one fatality occurred at dirt track meets sanctioned by the national organization. While a few drivers have been injured, none was seriously hurt, while the records show that not a spectator was injured during the year.

The contest board took in $13,225 in sanction fees; $1,140 was collected in drivers' licenses; $100 was paid for stock car certificates and $320 was paid over for track licenses. The expenses of the board amounted to $8,170.

Chairman Batchelder, of the executive committee, made a brief report in which he told how the association now has 451 clubs allied with it, 148 more than the A. A. A. had a year ago. There are forty-four active state associations.

The Ohio Automobile Federation desired to be recognized as a state association, whereas the Ohio State Automobile Association already has the franchise. The Ohio State Automobile Association was opposed to the recognition of the federation, but the matter never came to a vote.

The new officers are as follows: President, Laurens Enos, Buffalo; first vice-president, John A. Wilson, Pennsylvania; second vice-president, Dr. H. M. Rowe, Maryland; third vice-president, R. W. Smith, Colorado; fourth vice-president, F. L. Baker, California; fifth vice-president, Asa Maine, Minnesota; secretary, J. N. Brooks, Connecticut; treasurer, H. A. Bonnell, New Jersey; chairman executive committee, A. G. Batchelder, New York.

It was decided to open a branch headquarters in Washington.

There was a lively fight for the next annual meeting, participated in by Buffalo, Texas and Virginia. The last named won out and the next session will be held in Richmond.

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CHICAGO, ILL., Dec. 3—(*Special Telegram*)—At the meeting of the new executive committee today, President Enos announced the reappointment of the following chairmen; Contest, William Schimp; Good Roads, George C. Diehl; Touring, Howard Longstreth; Legislative, Charles T. Terry.

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Tourists Pour Over Rincon Road

SANTA BARBARA, Nov. 25—The opening run over the Rincon sea-level road, which shortens the distance between this city and Los Angeles 9 miles and overcomes the Casitas pass, exceeded all expectations.

More than 150 automobiles made the 100-mile trip from the southern city, and it was estimated that more than 500 cars were driven to the Rincon yesterday, when 2,000 persons enjoyed an old-fashioned Spanish barbecue, provided by the Santa Barbara chamber of commerce.

The chamber of commerce committee in charge of the celebration was treated to its first surprise Saturday evening. It was predicted that not more than 100 cars would come north, but when a check was made at the Potter and Arlington hotels late at night, it was found that more than 150 had made the trip, carrying nearly 600 persons, thus breaking all state records for a run of the century distance.

The cars from the South all bore pennants, "Santa Barbara Rincon Run."

The visitors remained here over night, journeying southward again the following morning.

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DuPuy Heads Pennsylvania Rubber

At the recent annual meeting of the Pennsylvania Rubber Company, Herbert DuPuy retired from the presidency in favor of H. Wilfred DuPuy, still continuing as treasurer of the company. The new office of chairman of the board was created, to which the retiring president was elected. Re-elected to continue in their same offices as formerly were: Charles M. DuPuy, vice-president; Seneca G. Lewis, general manager; George W. Shiveley, secretary; Charles G. Morrill, assistant treasurer.

Herbert DuPuy for some time past has been unable to take an active part in the management of the company on account of his increased responsibilities as chairman of the Board of Directors of the Crucible Steel Company of America.

Contracts with distributors now in hand assure an increase for the year of 100 per cent. over the business of 1911. The entire production at prevailing capacity is already sold for the ensuing year.

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Dealers Order Charter Application

Application for a charter for the Motor Dealers' Contest Association, of New York, will be made immediately as the result of a meeting of the members of that organization on Tuesday. A temporary board of directors was chosen consisting of fifteen with J. C. Wetmore at the head. A general meeting of the association will be held December 13 at the Elks' Club at which the program for the annual meeting in January will be outlined.

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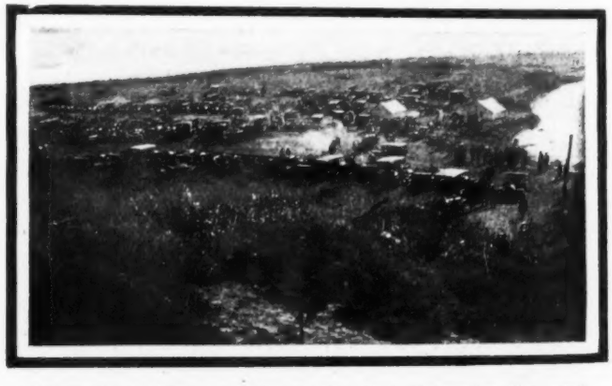
Madison Square Garden, the scene of many a circus sensation, has added one more to its list. Automobile polo is the latest, and as a spectacular feature it is a distinct success. The efforts of Messrs. Hankinson and Marine, the promoters, brought together a crowd of 6,000 on the first night and it is predicted that the game will grow in popularity because of its thrilling features.



Cars parked at Rincon Point on the day of opening the road

Elgin Races Next August

This Year's Compact Between Elgin Road Race Association and Chicago Automobile Club To Be Continued

Limit of 450 Inches To Be Adopted—Much Business Transacted at Grand Rapids Show

CHICAGO, ILL., Nov. 30—Announcement is made that the Elgin road races will be run in 1913 and that the compact entered into this year by the Elgin Automobile Road Race Association and the Chicago Automobile Club will be continued. The meet will take place the latter part of August as usual and it will be marked by the adoption of the 450-inch limit, an idea originating at Indianapolis and intended to encourage the competition of American manufacturers.

The 1913 plans were discussed last Tuesday night when the Elginites gave a dinner to the members of the contest committee of the Chicago Automobile Club. It was agreed that the partnership be continued and the prospects were declared to be rosy. An innovation decided upon was to have only one race each day instead of two or three as has been customary. The first day will be given over to a non-stock race for cars 300 cubic inches and under, while the second day the one event will be for cars 450 cubic inches and under. The promoters have decided to make the distance in both races the same—about 300 miles—in order that comparisons may be drawn as to the relative speed abilities of the two classes. Heretofore it has been customary to hold the small cars down to short distances.

Private owners are to be encouraged to enter and with this idea in mind there will be a special trophy offered. B. C. Patterson, who tried hard to import the Peugeot team last summer, has pledged himself to make an entry. It is thought he has in mind trying for an English Sunbeam.

The meet will mark the re-entry into competition of a famous trophy which has been on the shelf since 1910—the Cobe cup. Ira M. Cobe, president of the Chicago Automobile Club, has agreed to turn the trophy over for the Elgin meet, provided the name be changed. Therefore, it is to be called the Chicago Automobile Club cup and it probably will be offered in the first day's race. It is hoped to have the Elgin National for the second day, provided an agreement can be made with the Chicago Motor Club, which holds the deed of gift.

Simplex Sets New Track Mark

RICHMOND, VA., Nov. 30—The raising of the "outlaw" ban on the mile circular dirt track of the Virginia State Fair Grounds, where today and yesterday, under the sanction of the American Automobile Association, the Richmond Automobile Club conducted a professional automobile meet; the lowering of the track record on the two successive days by Louis Disbrow, driving a Simplex, and a Kline Kar, driven by William Morton, flying the track twice in one afternoon while traveling at 50 miles an hour without other damage than ripping away tires, were features of Richmond's first automobile meet in which drivers of national and international reputation competed.

Big Sales at Grand Rapids Show

GRAND RAPIDS, MICH., Nov. 30—With an attendance record of 30,000 marked up to its credit during its 4 days and 5 evenings run, Grand Rapids' fourth annual automobile show ended most happily tonight.

In interest, attendance, value and variety of exhibits, and in everything but number of sales direct to ultimate consumers the show far eclipsed its three local predecessors. Upwards of eighty lines in 140 odd models, all represented by local dealers, were shown on the floors of the exhibit space, while everything in the line of accessories was shown, beside all motorcycles sold in this market.

The buying trend noticeable seemed heavily toward the medium and higher grades of cars. The Cadillac and Rambler lines, strongly represented, did heavy business. Several sales of $5,000 cars were effected, these including Packards, Kissels and Whites. The best single sale was of a White big six for $5,225. The Overland company exhibit, including every model of that line, the Marmon, Federal truck and Standard Electric, was turned over to the sub-agents of that company, twenty-four of whom were in almost constant attendance receiving their prospects.

Road Builders Meet in Cincinnati

CINCINNATI, O., Dec. 2—The ninth annual convention of the American Road Builders' Association and the third American Road Congress will be held here at Music Hall starting Tuesday, December 3, and running to Friday. Men from all parts of the country interested in the good roads movement will attend. The program which has been mapped out is extensive.

A special feature of the convention will be a big entertainment given in honor of the visitors at the Business Men's Club, December 4. It is expected that there will be an attendance of between 1,500 and 2,000. Addresses of welcome will be made by Congressman-elect Stanley Bowdle, by Mayor Hunt on behalf of the city; by Prosecuting-Attorney Pogue, on behalf of Hamilton County, and by President Walter Draper, on behalf of the Chamber of Commerce.

Machine Tool Show Definitely Fixed

The project of holding an exhibit of machine tools in connection with the annual New York show has been definitely settled. The exhibition will be held as a portion of the part two period, beginning January 20. Assurances of co-operation on the part of the Machine Tool Builders' Association as a body and also from individual members representing large companies have been received and a large and varied exhibit has been promised.

THE KELLS MOTOR RADIATOR COMPANY, capitalized at $650,000, has been incorporated to manufacture and deal in automobile radiators and motors. The incorporators are H. R. Bingham and A. F. Garbe of New York and C. A. Cole of Hackensack. The company is closely related to the W. J. Kells Manufacturing Company, of New York.

View of the Rincon 2,000-foot causeway just opened to tourists

Simplified Handling of High-Speed Steel Problems Developed in Large Shops of Parisian School of Pyrology—The Use of Compensated Modern Planimeters for the Testing of Motors in Experimental Departments of Industry

TEMPERING and Selection of High-Speed Steel—The method developed by Taylor and White for tempering high-speed steel still remains the best devised for rough-turning and planing of mild, medium and hard steels. It consists in the following operations: (1) Slow heating in furnace to 800 deg. C., (2) rapid heating in furnace or forge fire to near the fusion point, (3) dipping of tool in a lead bath of 640 deg. C., (4) cooling—slow or rapid—from 640 deg. to atmospheric temperature, (5) annealing the tool in lead bath of 640 deg. (6) cooling—slow or rapid, at option—from 640 deg. to atmospheric temperature, (5) annealing the tool in lead bath of 640 deg., (6) more or less deformed and deteriorated by oxidation, and it is necessary to grind away several tenths of a millimeter to get to the sound metal.

For this reason this method is not so well adapted for drills, half-rounds, taps and milling-cutters in which the exact form of the cutting edge should be protected against the effects of oxidation, which become marked when the metal is exposed to the air at above 900 deg. C. At the Central School of Pyrology in Paris it has been found preferable to heat this class of tools in a bath of barium salt kept fused at a constant heat by means of a tri-phase electric current, and the following method for treatment of the tools has been developed:

(1) The tool is heated slowly to about 600 deg. in one muffle oven and then to about 900 deg. in a second muffle oven. To avoid oxidation in these ovens, pieces of incandescent charcoal are placed at the entrance of each of the muffles.

(2) When taken from the 900 deg. muffle the tool is suspended by means of tongs above the chloride of barium bath with only that part of the tool which is to be hardened immersed in the bath. The temperature of the bath is measured with a Féry pyrometric telescope and is maintained constant, with a tolerance of plus-minus 10 deg. C., by means of a rheostat placed in the inductor field of the generator used for producing the tri-phase current. The tool is left in the bath until it has taken the temperature of it.

(3) When leaving the chloride bath the tool is immediately plunged into a lead bath of 640 deg. and is kept there till it has reached the same temperature.

(4) Thereafter the tool is thrown into a trough with oil where it is cooled slowly to atmospheric temperature.

(5) Annealing, if there is occasion for it, is obtained by placing the tools in a muffle oven maintained at close to 600 deg. C., and white-hot charcoal is again placed at the entrance to obviate oxidation.

(6) Thereafter the tools are cooled in oil.

This method is modified in the case of tools intended for working upon tool steel, chilled cast iron or 25 per cent. nickel steel, for which work the temper produced by the method is too soft. For this class of work the cutting edge is quenched in oil, and annealing is omitted.

For work on brass and similar soft metals the method is also modified, as these metals are worked at a speed sometimes exceeding 100 meters per minute and the slightest hitch between the tool and the work causes the breakage of the former if it has received a too-high temper. Tools for this class of work are air-hardened. When the tool is taken out of the barium bath the tongs which hold it are hung above an air current produced by a blower. This modified method, which would oxidize completely a tool heated in a furnace, does not in the least deteriorate a tool heated in a salt bath as it is protected from oxidation by the layer of chloride which covers it. After the air-cooling the tool is annealed at a heat ranging toward 600 degrees C., as by the ordinary process, and is cooled in oil.

DETAILS AT VARIOUS STEPS OF THE PROCESS

It is not necessary to preheat all work before plunging it into the chloride bath. Practice shows that small tools of 5 millimeters thickness or less may be plunged into it directly. Only, they should be withdrawn three or four times, so as to make them take the heat more slowly. For pieces thicker than 5 millimeters it is important to have two muffle ovens, one heated up to 600 and the other up to 900 deg. C., so as to render the tool's absorption of heat gradual. It is, in fact, during the preliminary heating that large pieces warp before hardening. The pieces should not be taken from the first oven till they have reached 600 degrees, nor from the second to the chloride bath till they have reached 900 degrees.

The chloride of barium bath should hold about 3 liters and be about 200 millimeters (8 inches) deep. The container should be hollowed out of a refractory stone capable of withstanding the high temperature. To start the bath, the cavity of the container is brought to red heat by means of a gas flame. While this is being done, the chloride of barium is placed in a refractory crucible and is melted in a furnace. When fused it is poured rapidly into the red-hot container and the tri-phase current is at the same time turned on. Thereafter the temperature rises rapidly and when it has reached the degree wanted for the steel under treatment the rheostat is adjusted to maintain the temperature constant. When the work on hand is done, the bath is tipped into the refractory crucible, and the container is cleaned with an iron scraper to remove all detrition.

The Féry pyrometric telescope is permanently installed above and to the left of the bath. The galvanometer which is connected with the telescope by a double wire is placed in full daylight, so that the displacements of the hand may be easily and accurately observed.

The following method is used for determining the most favorable temperature for hardening in each case. A piece of high-speed steel about 3 millimeters thick is shaped as a half-round at one end with a very sharp thin edge and this is immersed in the barium bath for at least 3 minutes and is then quenched rapidly in water to dissolve the chloride. If the edge has retained its sharp angles, the temperature of the bath is raised 20 degrees, and the experiment is repeated. After a certain number of trials one finds in this manner the temperature at which the cutting edge begins to melt and which is designated as the fusion temperature of the steel in question. The number

of degrees indicated by the pyrometer as corresponding to this temperature varies with different instruments but remains constant for the same instrument.

So as to be sure of not injuring any tool the heat of the bath is kept 50 degrees below the fusion temperature, and all tools are raised to this heat whether they are to be tempered in air, lead or oil.

The tools should remain from 2 to 5 minutes in the chloride bath, according to their size. In order to be able to temper several tools at the same time a number of wires are strung horizontally above the bath, one above the other, and the tongs which hold a tool are hung from one wire or another according to the length of the tool, so that in each case only the part to be hardened dips into the bath. In this manner four jobs may be done at the same time. When one tool is ready to be tempered it is withdrawn from the bath and replaced by another. Tempering two tools per minute is a speed easily reached, and this can be increased when several tools of the same kind are hung from the same tongs, which is the usual practice for small tools.

When the tools have been tempered and annealed they are covered again with a layer of barium chloride, and when the tool is to be used this layer may be easily removed by leaving the tool for some time in boiling water.

GETTING A TRI-PHASE CURRENT FROM SIMPLE DYNAMO

At a place like the Central School of Pyrology in Paris where several hundreds of machine tools are in use, the wear of tools is so much reduced by the use of high-speed steel that regrinding and tempering is required only once a week. Under these conditions it is not necessary to install a special tri-phase current dynamo. One of the generators working with continuous current, either for lighting or for power transmission purposes, will furnish the required current while the hardening is going on. The 220-volt current passes through a transformer which reduces it to 15 volts.

To maintain a 3-liter bath at the fusion temperature for high-speed steel, a current of 300 amperes for each phase is required.

TESTING HIGH-SPEED STEEL FOR ACCEPTANCE OR REJECTION

Most of the many high-speed steels in the market give good results for work in soft and medium hard steels; a smaller number work well with hard steels, but only a few choice marks give satisfactory results for crucible alloy steels, chilled cast iron and 25 per cent. nickel steel. In order to avoid stocking up with high-speed steels which are not suitable for all kinds of work, the Central School of Pyrology has gone into considerable research work on the subject and has arrived at a certain testing method which is simple, inexpensive and in the main satisfactory. The proceeding is as follows:

Select from each shipment a certain number of bars. Cut from each of these a piece of steel from which there can be forged or machined a piece about 150 millimeters long by 12 millimeters square. Harden these pieces as stated in the foregoing and mount them to work in a tool-holder of a filing machine. Determine the average weight of shavings from 25 per cent. nickel-steel obtained between two successive mountings. Compare this weight with that which a good high-speed steel should give, and accept or reject in accordance with the result of this comparison.

In order that this test may be justly decisive it is important that the conditions should always be identical. The rules adopted in this respect at the Central School are as follows:

The tool is mounted as a simple planing tool. All forms are calipered to measurements, so that the tools always have the same cutting angle, rake and clearance, as well as the same rounding of the cutting part.

The tool-holder may be of any form, provided only that the tool when placed in it always extends in the same direction with relation to the axis of the holder.

Any filing machine of medium power and in good condition may be employed by modifying, as described below, the control rod for the tool-holder slide. This modification, which can be applied to all filing machines, has a double purpose; namely, (1) to render the charge of the tool less brutal and (2) to permit stopping the test when the tools have reached the same degree of wear.

The modification consists in making the control rod in two pieces telescoping one into the other and united by several pairs of washers. When the cutting edge reaches contact with the work-piece the washers are compressed gradually, allowing the tool to take hold without violence. The compression of the washers increases with the wear of the tool. An index hand, the point of which moves over a graduated sector, amplifies and measures the compression of the washers. Each test is stopped when the hand reaches a certain mark on the scale.

The average linear speed of the tool during the test work is close to 12 meters per minute. The depth of the cut is 1 millimeter. To make sure of it, an index hand is secured upon the movable part of the tool-holder moving over a millimeter scale on the head of the slide-rest. The feed is approximately 1-4 of a millimeter which corresponds to one tooth of the gear pinion controlling the displacement of the tool-stock. The test is stopped when the index hand during the work shows a high compression of the washers by brusque oscillations beyond the stop-mark on the graduated scale.

Evidently other rules may be substituted for these, the main requirement being the safeguarding of an equality of the conditions under which the tests are made.

The nickel-steel used for the tests should analyze between 20 and 25 per cent. of nickel, and untreated test pieces of it should give at least the following figures for tensile strength: Elastic limit average 35 kilograms per square centimeter, minimum 32; ultimate strength average 95, minimum 90; elongation average 35, minimum 32.

Tests made under these conditions with a good high-speed steel, hardened as described, give regularly close to 1 kilogram of shavings between two successive adjustments of the tool. To obtain a clear showing, it is necessary to make at least three consecutive tests with the same tool, remounting it several times, and to take the average of the results obtained.

This testing method is much simpler than that defined by Taylor but does not serve the same purpose. Taylor sought to determine the best method of tempering, with a view to obtaining the highest efficiency for roughing tools. For this purpose his method remains the best.

The method here outlined has for its object to make sure that the high-speed steel put in stock is of very good quality and can give good results in work with the most difficult metals and alloys.—From article by P. Gorgey, captain of artillery, instructor at the Central School of Pyrology, in *Technique Moderne and Revue Pratique des Industries Métallurgiques*, September and October.

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CORRECTING and Utilizing Planimeter Readings—In the measure as competition in the manufacture of automobiles and motors becomes keener and the necessity becomes more apparent for combining quality with quantity in production, the means for ascertaining just what a motor or a carbureter, or the two in combination, will do throughout their range of adjustments are getting to be more and more a subject for serious practical consideration in the experimental departments of manufacturers. Dynamometer tests are required to be verified by diagrams obtained from manographs or indicators—and obversely—and all expedients for simplifying these testing methods, and at the same time removing the causes of possible errors in their application by employes of average attainments, begin to spell dollars by the thousands, in as much as their use or non-use eventually comes to mean a reputation or a lack of reputation for that freedom from little nettling flaws and troubles in the operation of a car which the public appreciates above all else, once it has been demonstrated to be within reach

through the painstaking work of the technical leaders in the industry. To reconcile such painstaking work, which is largely in the nature of applied science, with the requirements of economical production is a task to which European and perhaps especially German engineers are now devoting a large portion of their energy. The Sternol oil-testing machine (mentioned in THE AUTOMOBILE of January 11), machines for verifying the cut and efficiency of gear teeth (THE AUTOMOBILE of Dec. 21, 1911), the minimeter devices (THE AUTOMOBILE of May 2), Brinell and other testing methods (THE AUTOMOBILE of Feb. 29, March 14 and July 4), machines for polishing test pieces (THE AUTOMOBILE of April 4), the accelerometer (THE AUTOMOBILE of October 10), other transmission dynamometers (THE AUTOMOBILE of October 24) and the micro-indicator (THE AUTOMOBILE of November 28) exemplify this movement by which Europe expects to render mass-production methods technicaly as well as economically satisfactory.

THE PRINCIPLE OF ORDINARY PLANIMETERS

The verification of planimeter readings comes in the same line of efforts, because the measurement of the area of an indicator diagram, or rather the measurement of many such diagrams, constitutes an indispensable method for ascertaining and recording the inner workings of a motor. The planimeter was invented in 1854 by Jacob Amsler and his construction has not been improved till lately when the compensating planimeter was introduced, by which errors due to wear or flaws of the instrument may be easily corrected. The ordinary planimeter is composed of two rigid arms of which one carries the angle-pole or fixed point P, Fig. 1, and the other the tracer T. A universal joint permits all relative displacements of these arms, and a roller M placed at the opposite end of the tracer rests on the level and either rolls or slides on the paper in following the movements of the tracer. To make use of the instrument it is only necessary to stick the pole pin into the paper at one point and to follow the contour of the area with the tracer. The revolutions of the roller, as recorded on a scale, then constitute a measurement of the area. Mathematically it can be proved, in fact, that the area of any figure whose perimeter has been followed by the tracer equals the area of a rectangle whose base is the length of the tracer arm and whose height is the distance travelled by a point on the circumference of the roller.

If L is the tracer arm, M the circumference of the roller, n the number of its revolutions and nM consequently the distance travelled, the area S equals L multiplied by nM, and as L and M are constant factors, at any one adjustment of the tracer arm, this can be written: S equals Kn.

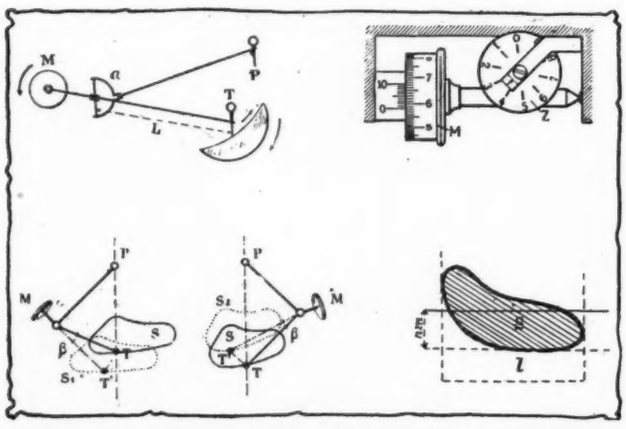
In practice, the unit of measurement is not the surface ML, but a 1/1000 part thereof. It is this unit of the graduate scale which we call K, and n is the number of K-movements made by the roller. The absolute value of K depends, then, on the length of the tracer arm, which in turn is determined by the point at which the joint a is attached to this arm. The instrument has therefore on this arm marks which give the value of K according to the point of attachment of a. In most instruments the value of K varies between 2 and 10 square mm.

K being fixed, only n remains to be measured, and this is done by a watchwork of the type indicated in Fig. 2. The tracing is always done "with the clock." Thus, if the watchwork showed, for example, 3,500 at the beginning of the tracing and 3,584 at the end of it, and the value of K is 10 square millimeters, the area traced is 10×84, or 840 square millimeters.

The accuracy of this reading depends, however, essentially upon the parallelism between the axis of the roller and the mathematical tracer arm, which is not identical with the visible tracer arm but is a straight line from the center of joint a to the point of the tracing stylus. If this parallelism is not accurately materialized in the instrument—and rough handling may easily disturb it, even in good instruments—all the area measurements will be more or less faulty.

That non-parallelism has this effect is easily understood. Assume that the two parts of Fig. 3 have been traced with an instrument in which the deviation from parallelism is represented by the angle beta (β). The roller now does not measure the area of the surface S which has been circumscribed by the material tracer T but that of a surface S_1 and S_2 which would be the one followed by a hypothetical tracer T, situated exactly in the prolongation of the roller axis. By placing the planimeter in two symmetrical position around the same pole, as instanced in Fig. 3, and outlining S_1 and S_2, it is readily proved that S equals S_1 plus S_2, divided by 2; that is, as the same error is committed in one case to the positive side and in the other to the negative side, it disappears when the mean of the two measurements is taken. The error is "compensated."

On this principle, in order to rectify a planimeter, one should make it trace a perfectly known area, preferably in two symmetrical positions from the same pole, and either determine the exact length of the arm L at which K will correspond to reality or else correct the obliquity of the instrument by means of a compensation-device adjustable by a screw. These corrections cannot be made, however, with ordinary planimeters. A special construction is necessary to permit the symmetrical reversal of the instrument, and a special screw for adjusting the axis of the roller is required. In practice such compensating devices are quite necessary, as the errors in the use of a worm planimeter may be relatively large and the results of elaborate tests of motors often depend upon the measurements taken of a few diagrams of small size and produced at different times. In the experiments of the author the Ott compensating planimeter is used which he considers the most modern and perfect of the instruments actually in the market.



Figs. 1, 2, 3 and 4—Illustrating the utilization of compensated planimeters

FINDING THE MEAN INDICATED PRESSURE

Some hints with regard to the practical use of planimeters may not be superfluous. The object of measuring the area of an indicator or manograph diagram is to determine the average height h_m of the indicator spring displacement from which the mean indicated piston pressure of the motor is computed. By two tangents to the diagram, as in Fig. 4, its length l is determined; let k be the unit of area corresponding to the adjustment of the instrument, n the distance traveled as marked in figures on the scale. The area S equals nk. We then have:

$$(1) \qquad h_m = \frac{S}{l} = \frac{nk}{l}.$$

FINDING HORSEPOWER BY THE PLANIMETER

If one has a large number of diagrams to measure, all taken from the same motor, precious time may be gained by making the planimeter give directly the indicated horsepower.

(*Continued on page* 1187)

Those Counterstrings

Forrest R. Jones Scores Against Editorial Opponent in Mathematical Correctness of Counterspring Theory

But Opponent Maintains That the Bare Theory Though Correct Is Misleading in Practice Unless It Is Amplified

IT was the mathematically supported contention, in an article by A. Contet, which was translated in THE AUTOMOBILE of Sept. 26, that the addition of a counterspring to an ordinary vehicle spring results in a compound spring which is less flexible than the original vehicle spring, although the vehicle load is supported by the latter alone, and it was stated by Mr. Contet that, for this reason it is common practice, whenever a counterspring is added, to remove one of the leaves of the original spring, so as not to impair the flexibility. It was also noted that springs doctored in this manner show signs of weakness in practice. The correctness of the theory was doubted in an editorial note, contesting the correctness of the mathematics on which it was based. Then a communication was received from Mr. Forrest R. Jones, upholding Mr. Contet's theory and giving new mathematical proof for its correctness, and this was published in THE AUTOMOBILE of Oct. 31 Concurrently therewith an editorial note again gave expression to dissent on the ground of an alleged fault in the application of the mathematics.

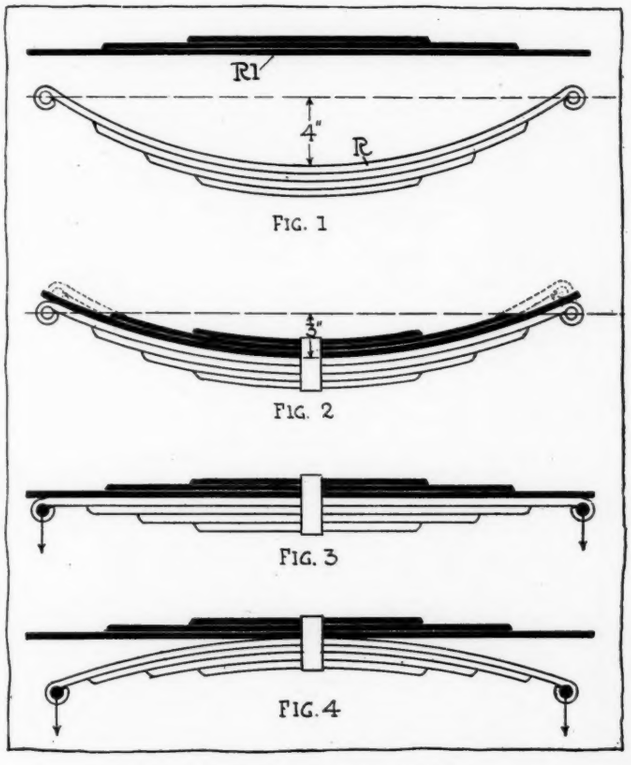
Promptly, under date of Oct. 8, another communication from Mr. Jones was received in which it is stated that "In Editor's note, Sept. 26 [should be Oct. 31], every sentence, as a whole, presents a statement that is in error, except the first sentence and the last paragraph. The old stumbling block of negative values seems to have tripped him." The communication also contains much additional matter tending to prove that the theory expounded by Mr. Contet and by Mr. Jones is truly correct, but the length of this additional reasoning and the fact that it merely confirms what had previously been set forth very adequately by Mr. Jones, and gives no new viewpoints on the practical importance of the theory, militate against its publication *in extenso* in this issue. The editorial commentator has seen the light. The theory and the mathematics are correct. The compound spring, in which the counterspring forms a part, IS less flexible than the simple spring from which it is built up. The object of discussion is strikingly attained in this admission.

Nevertheless the fact, as noted by Contet, that this theory leads to the practice of eliminating one of the leaves of the original spring, in order to restore the lost flexibility, shows that it is vicious and academic, unless the reason for the reduced flexibility is specially explained.

In reality the compound spring is less flexible than the original spring only because its construction involves the imposition of an extra load on the original spring, and because this extra load is not considered when the flexibility is calculated from the deflection caused by a given load. The compound spring is constitutionally deflected to start with, and this initial deflection is not counted. The reduction of flexibility is not of the same kind as that obtained by an extra leaf. On the contrary it is obtained by putting a load into the spring itself in the form of the counterspring's downward pressure, thereby adding to the burden of the original simple spring and weakening it proportionately. The amount of vehicle load which can be placed upon it with safety is reduced by the amount of the load which the counterspring imposes.

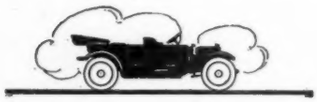
In the accompanying illustration, Fig. 1 shows the original spring R and the counterspring R_1, both unstressed. The supposition is that a stress of, say, 500 pounds is required to flex R_1 three inches and that the same stress will flex R only one inch. When the two springs are clipped together, as in Fig. 2, the open of R will thus be reduced from four to three inches, while the counterspring will be flexed three inches. Now, when the unloaded compound spring (Fig. 2) is put under load of 2000 pounds, acting solely at the eyes of R, it will assume the shape shown in Fig. 3, because in this position the counterspring has ceased to act and 2000 pounds will bend R four inches. Considered as a compound spring-unit it has undergone a deflection of only three inches, however, and this is the fact which is considered in the mathematical theory. The deflection of R shown in Fig. 2, which is one inch, is omitted from consideration, because it is not technically the result of a vehicle load And thus it may be contended successfully that the compound spring is less flexible than the original spring R, since it is deflected only three inches under the same vehicle load which deflects the simple spring R four inches. A practical limitation to the mathematical theory is illustrated in Fig. 4, which represents the position of the compound spring under a load larger than 2000 pounds. In moving from the position of Fig. 3 to that of Fig. 4, the original flexibility of R has of course been restored, technically and otherwise, simply because every counterspring in practice has a limited range of action, which fact is unconsidered in the mathematical theory.

This leads to the only really important question in the whole matter, which is: How may countersprings be used to advantage? It is seen that they stiffen and at the same time weaken a spring. In order to obtain, then, the advantages which they may offer in the way of a brake on the rebound, it is required that the original spring should be stronger and more flexible than ordinarily necessary for its load. In other words the counterspring may be used as a moderator for an extraordinarily long, strong and flexible spring. Beyond the counterspring's range of action—under very severe shocks—the full advantage of the long spring's strength may then be enjoyed, while its excessive flexibility under ordinary conditions is reduced.



An example illustrating counterspring action

Coupé Body for Ford Runabout Chassis



Possible Combination of Two and Four-Passenger Design for Winter Travel

By George G. Mercer

THE body design here illustrated is made to fit the chassis of a Ford model T runabout. It is designed to occupy the same space as the runabout body, without disturbing the base or platform to which the gasoline tank, tool box and body are fastened. As with previous designs in this series, the original car is interfered with as little as possible so that the runabout body can be replaced on the return of warm weather without trouble or unnecessary expense. The change speed lever, being located in the center in this model, no alteration is necessary in this connection when adopting a closed body.

The Ford model T runabout has a wheelbase of 100 inches; the tires are 30 by 3 inches in front and 30 by 3.5 inches in the rear, the motor being 3.75 by 4 inches and as the manufacturers furnish a larger stock body than the one illustrated on the same chassis, the question of overloading need not be taken into consideration.

Fig. 4 is the side elevation of the suggested winter body, having the general lines of a miniature brougham. This body can be mounted and secured to the platform that rests on the chassis frame, the door and the framing around the door being of greater width than the platform, so as to overhang a distance of 6 inches. The object of this straddle-wise mounting is to create a more balanced appearance in the car as a whole by having deeper doors. A dotted line carried across the body in this illustration shows the upper surface of the platform. Below this line the door is of course simply a dummy, so far as its use is concerned. In the rear view, Fig. 3, the relative positions of the door and the platform are more clearly shown. The pillar projects beyond the sides of the platform. The body is very light, weighing approximately 550 pounds.

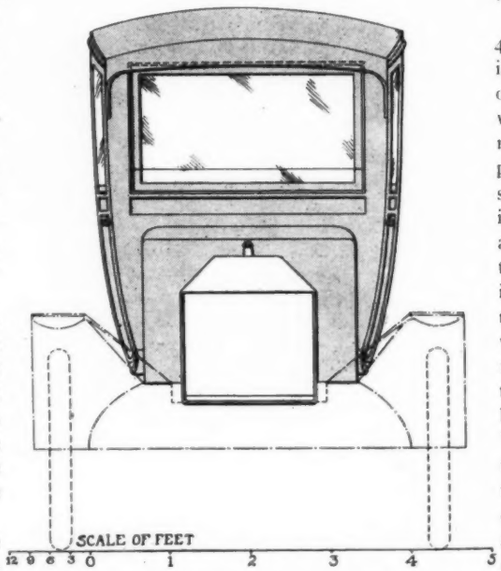


Fig. 1—Front view of Ford coupé design

From back to front, Fig. 4, measures 41 inches; the width of the door opening is 18 inches and the extreme width of the body, Fig. 2, is 46 inches. Notwithstanding these small exterior dimensions, those of the interior are fair proportions for two averaged sized persons. The size of the cushions, etc., are indicated on the three views, Figs. 2, 3 and 4. A considerable sweep is given to the line of the roof, Fig. 4, producing a lower general appearance without making the vehicle inconvenient in any way, as height is not necessary at either front or back. The windshield glass at the front is protected by a small leather bonnet stretched over a metal frame. Wood panels and framing are used throughout the design. The construction is identical with that used on horse drawn carriages and all framing is made as light as safety will permit. The windows of the doors and sides are made to lower for ventilation, while the rear pane is stationary. In order to obtain a rain visor, the front window is provided with hinges at its upper edge. Plain plate glass and mahogany frames are used for the windows. The cowl can be formed in either steel or aluminum. It is fastened to the back of the dash, rubber packing being inserted to prevent leaking. By not having to change the dash, the dash lamps remain undisturbed in position when the bodies are changed.

The most suitable colors for painting the body are the stock blue used on the runabout for the lower body panels, cowl and

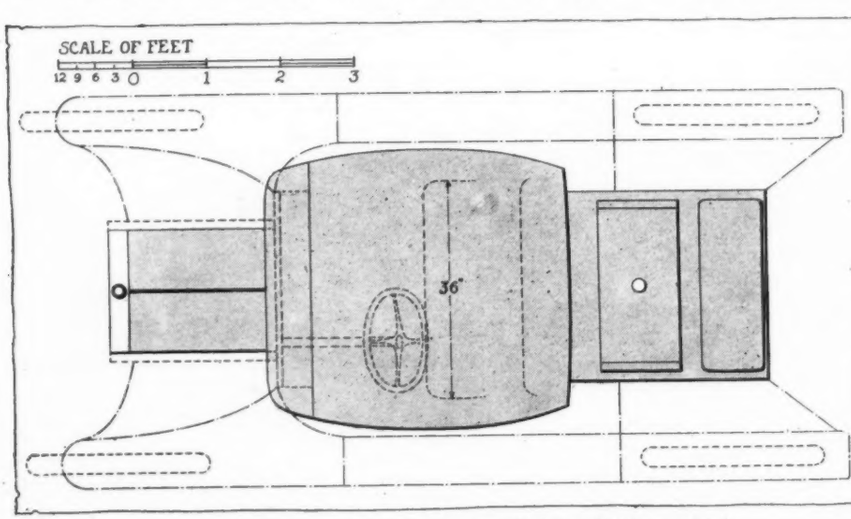


Fig. 2—Plan view of coupé suggested for Ford runabout

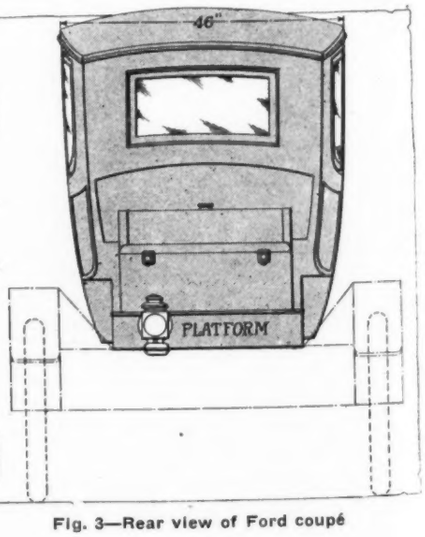


Fig. 3—Rear view of Ford coupé

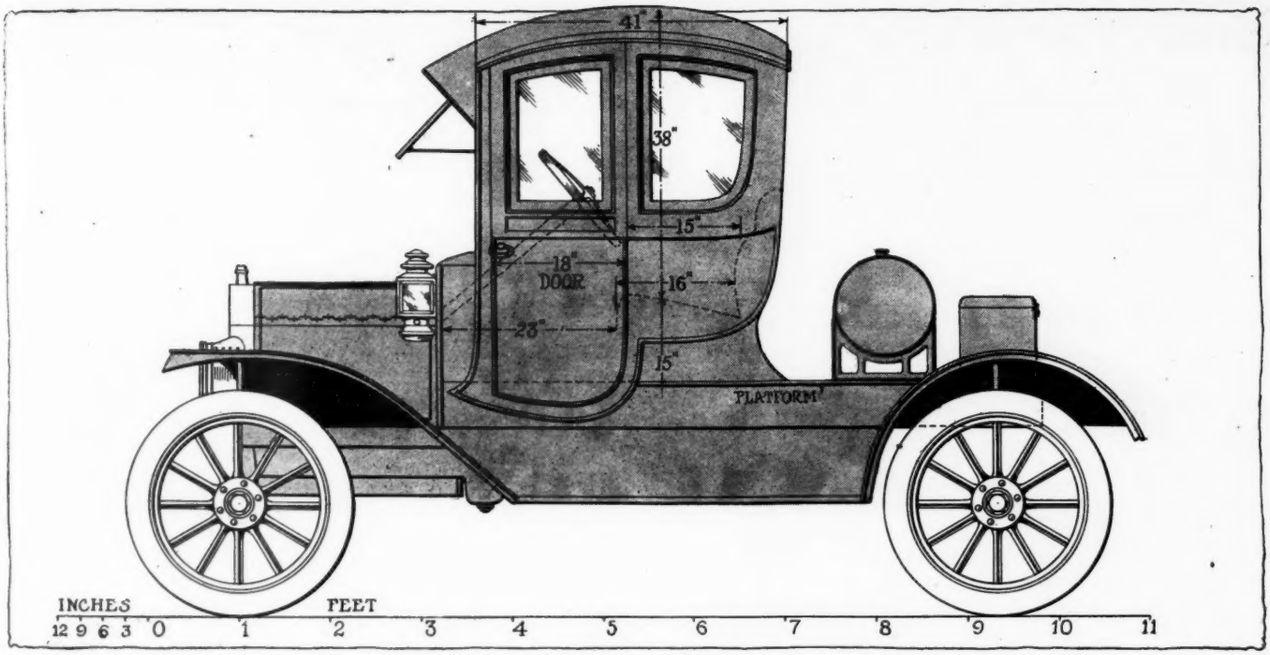


Fig. 4.—Side elevation of coupe body mounted on platform of Ford runabout

fore-body, with black mouldings, and black for the upper panels above the belt line and for the roof.

Leather may be used for the interior trimming. The material that is furnished in large skins as imitation morocco is very serviceable and as little liable to crack as the genuine article; in fact, it is a question if it is not a trifle more reliable in this respect. A suitable finish would be blue broadlace for binding on the doors, etc., blue carpet and blue silk curtains.

Inside, the appointments would be the customary silver-mounted electric dome light in the roof and very simple card and ash cases on the doors.

A further use to which the new body can be adapted is shown in Fig. 5, where it will be seen that the coupé body has been moved to the rear of the platform and a fore portion for the driving seat added. On general principles a combination body is not desirable, but in the present case, as there are no moving parts with hinges, all being easily and firmly attached to the platform no real objection can be raised. The fore-body is provided with side doors and a windshield is mounted on the cowl. A larger bonnet is fastened to the front of the body to protect the driving seat and from the front of this to the windshield is stretched a leather flap, that serves as a watershed and is also removable. Side curtains can be added that will entirely close the front when required. Leather trimming of the usual type would be found suitable for this part of the car.

The addition of this fore-body necessitates the removal of the gasoline tank and tool box from the rear and the placing of a tank under the front seat.

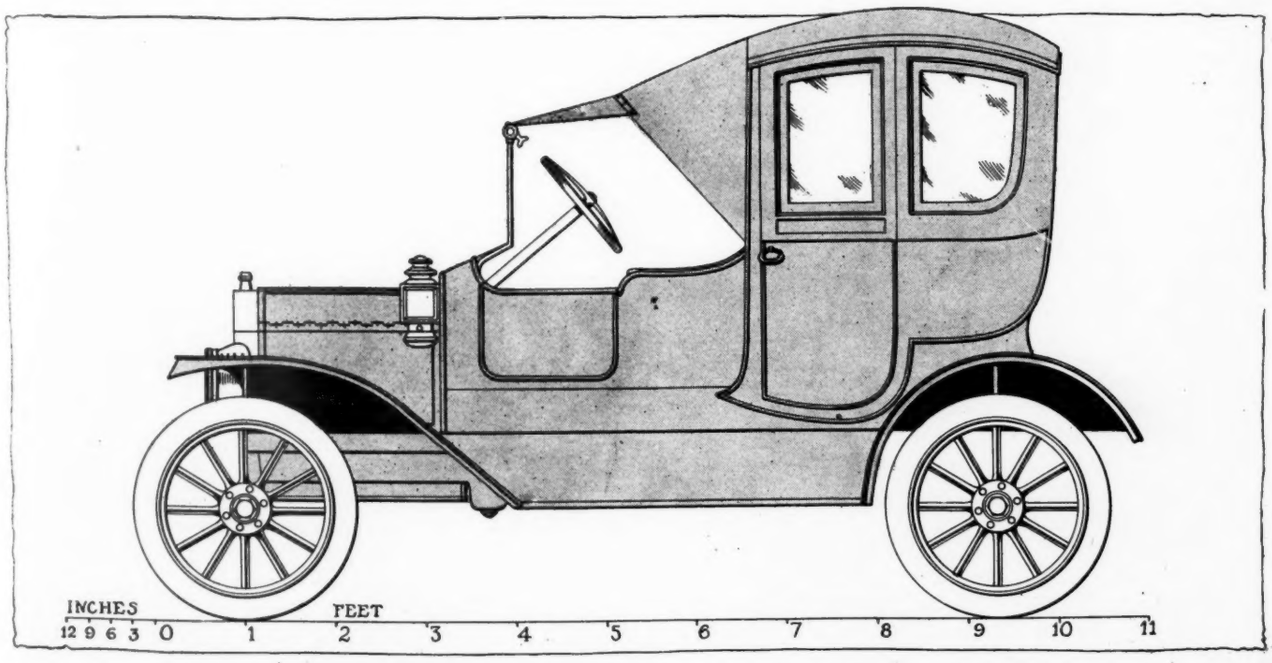


Fig. 5.—Same coupé body moved back on the chassis to permit of the addition of a fore-body

Gimbel Brothers' System of Delivery

How Ninety-five Freight Automobiles Serving 5,000,000 New Yorkers Are Handled Efficiently

Private Service Department of the Gotham Store Employs Fifty Men and Uses Ten Forms for Recording

MINIMUM standard cost of unit of work is the goal of modern industry and commerce. Forgetting for a moment that industry and commerce again serve a purpose, filling the needs of mankind, the attainment of that minimum cost of economic operation is the center toward which strive every man and woman who contribute to the work of the world. Every individual attempts to realize the condition maximum effect with minimum of effort in his or her personal work; so that, as soon as the interest of the individual actually becomes identified with that of the whole, a very high and efficient standard of the world's work may be a reasonable expectation.

At this moment, when the study of economic efficiency is but a babe and hardly past the embryonic stage, few people realize the importance of the problem outlined above. These people are generally those who see the differences of efficient and inefficient work, because they come in contact with huge bodies of labor, because upon their shoulders rest immense responsibilities, because through their hands streams the well-regulated current of the wealth of the planet. Little reflection is necessary to arrive at the conclusion that the processes adopted by these people in handling their work are the expression of supreme commercial intelligence at work today. They are, therefore, worthy of more than passing consideration of the progressive business man.

Delivery System for Stores

Department stores in large cities, which are the main centers of distribution, are today well ahead in respect of efficient operation. Much has been said about the concentration expended by store managers upon the increase of sales and the most advantageous methods of begetting these; yet, the transportation of the wares, after they are sold, is no less worthy of admiration. To carry it out, in the most profitable fashion, three things are necessary:

(A) Exact records must be kept of the goods shipped from the store;

(B) Exact records of the cost of delivering the goods sold must be kept;

(C) Conclusions drawn from the figures afforded by the above information must be used to devise ways and means to further reduce the cost of deliveries.

(A1) The records of the goods leaving the store are part of the store organization proper and are handled by the charging and shipping departments, who also arrange the outgoing packages, according to routes, so that the drivers may take the parcels out of bins and spaces assigned to them, individually, and distribute them over their delivery route. The charging and shipping records are, later on, checked against the delivery records of the drivers. From day to day, or from week to week, the company is thereby enabled to prepare digests of its business, as represented by the number of packages delivered. The results are the following values: packages delivered per day, week and month; packages delivered per wagon, per unit of time; average sales value of every package delivered.

135675

Battery No.

Amp-Hr Meter

Amp-Hr Needle

TIME	VOLTS	AMPS.	REMARKS

Fig. 1—Battery-charging record used in Gimbel garage

Form No. 1 G

GIMBEL BROTHERS 24th ST. GARAGE

REPAIR TICKET

MAKE OF CAR_____ JOB NO._____

DATE_____ CAR NO._____

REPAIRS

CHARGE TO

SIGNED_____

Fig. 2—Repair tag with which cars are sent to the shop

(B1) The following items make up the cost records of delivery: Direct and indirect maintenance cost, incidental expenses and loss. This information is carefully prepared, giving attention to every item, referring to every car operated by the company. Thus an exact history of every car is kept on record. Besides, average costs of various items per car may be arrived at. These averages divided in the average work done by a car give average delivery costs. These represent the final result of cost-keeping, so far as records go.

(C1) It is left for experts in the various departments of the delivery work and the automobile operation to improve on the operating figures.

The proposition (B) forms the sole subject of this article. It is proposed to show in the following the manner in which the delivery work of one of the greatest stores of the world is carried out. This refers to the New York store of Gimbel Brothers, the Philadelphia and New York merchants. This corporation effects the delivery of wares sold in the Manhattan store through the service of 127 automobiles, of which ninety-five are kept in the main garage in West Twenty-fourth street. The rest are stationed partly at the 183rd street garage of the company, with

the exception of several trucks operating solely in suburban fields. The fleet of the company is made up of eighty-nine electrics and thirty-eight gasoline trucks, the electrics taking care of city work only, while the gasoline trucks serve as transfer wagons to railroad depots and distributing centers of the company, about half a dozen of which are located in close proximity to New York.

The ninety-five automobiles stored at and operating from the Twenty-fourth street garage are served by fifty men, besides a driver and a helper for every truck. These fifty men are mechanics, repair shop men and garage hands. The system of using cars is as follows: All automobiles leave the garage at a specified time in the morning, starting for the store, where they are filled with packages to be delivered. As soon as a wagon has finished its route it returns to the store and is reloaded, time and again; in the evening it returns to the garage and the driver rings in his time on the clock as the working day is finished.

Delivery-record forms are ten in number. They cover every necessary point of information relating to the delivery itself, the maintenance of each car and the cost of both. The forms may be divided in three groups: (I) Time-record blanks, giving the distribution of the working times of the trucks. (II) Maintenance forms for recording gasoline or current, repair work and parts used and expended on every truck. (III) Cost-compiling forms which give the expenditures in dollars and cents, both for all machines and for every individual truck.

(I) The time of start and finish being recorded on a clock card which is kept at the garage, a form for the distribution of working time has been prepared, Fig. 4. This blank, 6 inches wide by 11.75 inches high, is printed black on tan paper. Each trip of every driver is recorded on this blank which is sent in the evening to the garage, where it forms, together with the clock card, an exact account of the driver's time for the day. The details of every trip appear on the delivery-and-receipt forms, not shown here.

(II) To keep the truck in running condition it requires fuel or current, lubricants, tires, as well as repair work and material which become necessary from time to time. The gasoline trucks draw for fuel upon the gasoline tank which is installed in the garage, and the fuel delivered to them is recorded on a duplicate roll of paper, such as used in many small stores. A copy of the record is kept in the garage and a duplicate given to the driver, who later on turns it over to the superintendent. In the case of electrics, a charging card, Fig. 1, is used every time a battery is charged. This card is 3 inches wide and 3.25 inches high, printed black on thin, white cardboard and ruled with blue lines. The degree of charging when the battery is turned over to the driver is recorded and a space for the odometer reading just before charging is allowed on the reverse side of the card.

Repair Forms Described

Repairs require a comparatively large number of records, due to the variable nature of this work, and following the example of up-to-date service departments, Gimbel Brothers in their garage have provided an elaborate cost-keeping system for this phase of their delivery organization. Repairs are undertaken either upon the request of the driver who notes a defect in his truck and brings it to the attention of the garage superintendent, or when the defect results in a breakdown in the street; likewise, if the truck meets with an accident. If the driver causes a repair to be taken up, he fills out the Motor Defect Card, Fig. 3, which affords space for ten items on one side, while the blank reverse side may be used if the remarks do not find space on the face side. This card is 7 inches high and 3.5 inches wide, printed black on thin tan cardboard. After the card is filled out, it is handed to the foreman on duty who represents the superintendent on the floor and who directs the necessary work to be done. If the truck, however, is disabled on the road, the driver telephones to the garage, and the message, which is taken in the office of the superintendent, is recorded on Emergency Call Card, Fig.

MOTOR DEFECT CARD.

INSTRUCTIONS: Drivers must report on this card, upon each return of car to Garage, all defects or other trouble with car occuring on date stated below, and, before leaving the premises hand same to Foreman on duty, using reverse side if necessary.

Cab or Truck No. ..... Date ..... 191....

Time ..... A.M. ..... P.M.

By ..... (Driver)

STATE BELOW PARTS REQUIRING ATTENTION:

1 .....
2 .....
3 .....
4 .....
5 .....
6 .....
7 .....
8 .....
9 .....
10 .....

Received by ..... Time .....

Repaired by .....

Examined by .....

Date ..... 191..... Time .....

GIMBEL BROTHERS, NEW YORK

Fig. 3—Motor defect card used by drivers to report trouble

No 120

Dept. ..... Date .....

TIME CHECKING SHEET

EVERY EMPLOYEE in this Department will enter their NUMBER, NAME AND ACTUAL TIME of arrival in the Department in the morning and EACH TIME THEREAFTER they leave or arrive in the Department during the entire day. There are no exceptions to this rule.

GIMBEL BROTHERS.

WRITE PLAINLY

Number	NAME	IN	OUT	Were you late? Say YES or NO

Fig. 4—Time checking sheet for recording drivers' trips

6. The latter is 11 by 8.5 inches in size, printed black on tan paper and kept in the office of the superintendent. When a driver calls up, his name, the number of his truck, his locality at the time of trouble, the number of the telephone used by him and the help required are recorded in the proper spaces; furthermore, all particulars relating to the relief car sent to aid find space on this form. In a corner of the card the used materials and their actual cost are noted.

Emergency Work Anticipated

A car which meets with an accident is either put in working condition on the road or hauled in to be repaired. Whenever a truck undergoes a repair, a repair tag, Fig. 2, is filled out. This tag is 8 by 5 inches in size, printed on tan cardboard of medium thickness and is filled out by the foreman with the particular repair jobs required on the car. When the tag has been filled out, it is attached to the truck, which is turned in the repair shop by the foreman. There labor and material used in the repair work are recorded on suitable blank, as they are in service department. As a matter of fact, the repair department of the garage may be well referred to as a private service department. The time ticket, Fig. 10, is filled out by every man who works on a car, the order numbering identical with the job number appearing in Fig. 2. The work being finished, the ticket is turned over to the foreman, who O. K.'s it. Of course, time-clock cards are also used for all people employed in the garage. As to the material used for repairs, a requisition of the same size as the time ticket, namely, 7 by 4 inches, is used. This requisition, Fig. 9, like Fig. 8, is printed black on thin white paper. It is used for all material kept in the stock room, including lubricants, and the cost of everything taken out is recorded on the requisition. Before anything is delivered to a shop man or driver, the requisition must be signed by the foreman on duty. After the respective materials have been delivered, all requisitions are filed away in the stock room, to be delivered to the superintendent's office in the evening, after which the account of every car is charged with the supplies or repair parts used on it.

When a repair job is completed, all the time slips and material requisitions are put together and a digest of them is made, the record being laid down on the cost card, Fig. 8. Every time a repair is done, this happens, and the various repair cost cards thus obtained are secured by means of clips to the monthly operating-cost record, Figs. 5 and 7.

The cost card blanks, which are used for the recording of gasoline and current, respectively, tire, repair and incidental expenses, are shown in Figs. 5 and 7. Fig. 5 is a monthly operating-and-maintenance cost sheet, 16 by 10.5 inches, affording a line for every day in the month, upon which the following information is entered: The number of the driver operating the truck on each day, the number of the battery—in case of an electric—as well as the current used; in this space the amount of gasoline is recorded in case of a gas truck. These points give the operating cost, or daily charges, against which the odometer reading is posted every day. Under maintenance charges are recorded the expenses incurred in the upkeep of the individual car, such as tire and battery repairs and replacements, giving the number of the repair job, or of the tire and battery installed.

Itemized and Totaled Costs

The average share of garage repairs and other general labor charges borne by every truck in the garage appear under the heading Other Charges; while standard information relating to the car is recorded at the head of the sheet. Space for a short description of repair work done on the car is provided in the left portion of the sheet.

General information abstracted from these detailed accounts is recorded on the reverse side of the form, the items being arranged from top to bottom as they are from the left to the right on the face side. The difference between the figures on the two sides is, of course, that the reverse side gives the totals

WHEEL NUMBERS: RIGHT FRONT, LEFT FRONT, RIGHT REAR, LEFT REAR — AMPERE HOUR METER No., ODOMETER No., MOTOR Nos., CONTROLLER No. — **GIMBEL BROTHERS, NEW YORK** — COST OF OPERATING MOTOR CARS — CAR No., NAME, TYPE — MONTH, 191

BRIEF DESCRIPTION OF REPAIRS	DAY OF MONTH	OPERATION: BATTERY NUMBER	DRIVER'S NUMBER	MILEAGE: ODOMETER READINGS	MILES	CURRENT USED: METER READINGS	AMP. HOURS	MAINTENANCE: GENERAL CHARGES NUMBER	GENERAL CHARGES AMOUNT	TIRES NUMBER	TIRES AMOUNT	BATTERIES NUMBER	BATTERIES AMOUNT	OTHER CHARGES: GENERAL CHARGES NUMBER	GENERAL CHARGES AMOUNT	ACCIDENTS NUMBER	ACCIDENTS AMOUNT
	1																
	2																
	3																
	4																
	5																
	6																
	7																
	8																
	9																
	10																
	11																
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	27																
	28																
	29																
	30																
	31																

EMERGENCY CALL CARD Date

Car No. — Route No.

Called by

Where from

Left Garage

Returned

Report Driver

Phone No.

Time Received

Material Needed

Relief Car No.

Left Garage

Returned

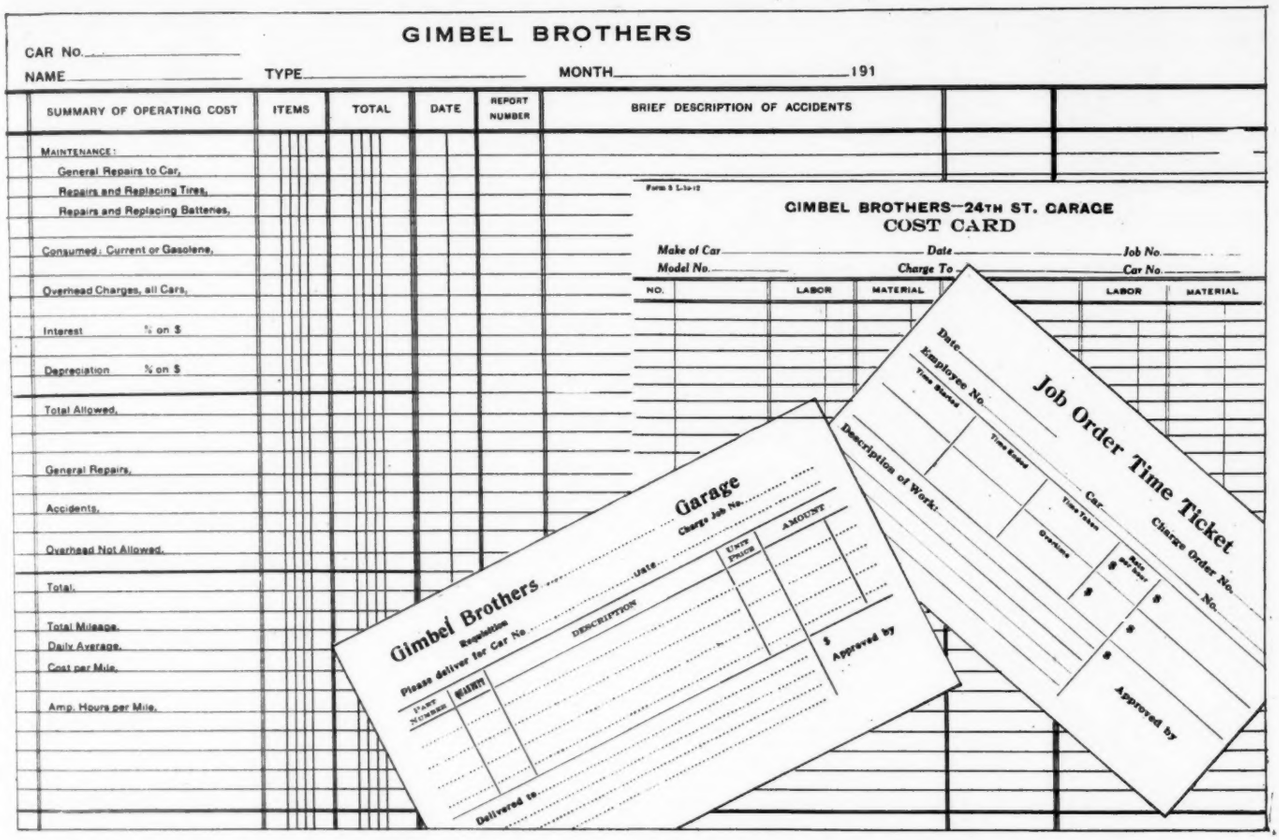
MECHANIC'S REPORT

Driver

Mechanic

Material Used	Cost

Fig. 5—Monthly record sheet for keeping track of expenses of individual trucks day by day. Fig. 6—Emergency card used at the garage for recording the cases of drivers meeting with trouble or accident while on the road


GIMBEL BROTHERS

CAR No.
NAME TYPE MONTH 191

SUMMARY OF OPERATING COST	ITEMS	TOTAL	DATE	REPORT NUMBER	BRIEF DESCRIPTION OF ACCIDENTS
MAINTENANCE:					
General Repairs to Car,					
Repairs and Replacing Tires,					
Repairs and Replacing Batteries,					
Consumed: Current or Gasolene,					
Overhead Charges, all Cars,					
Interest ¾ on $					
Depreciation ¾ on $					
Total Allowed,					
General Repairs,					
Accidents,					
Overhead Not Allowed,					
Total,					
Total Mileage,					
Daily Average,					
Cost per Mile,					
Amp. Hours per Mile,					

GIMBEL BROTHERS—24TH ST. GARAGE
COST CARD

Make of Car Date Job No.
Model No. Charge To Car No.

NO.	LABOR	MATERIAL		LABOR	MATERIAL

Gimbel Brothers Garage
Requisition
Please deliver for Car No. Charge Job No.
Date
DESCRIPTION UNIT PRICE AMOUNT
Time Number WANTS
Delivered to Approved by

Job Order Time Ticket
Date
Employee No.
Time Started
Time Finished
Description of Work:
Car
Charge Order No.
No.
Time Taken
Overtime
Rate per Hour
Approved by

Fig. 7—Reverse of Fig. 5, being a monthly summary of truck cost. Fig. 8—Cost card for recording the labor and material expended on truck repairs. Fig. 9—Requisition. Fig. 10—Job time ticket for shop work

for the months, referring to the several items, which are obtained by footing the respective columns on the face side. Fig. 7 shows that the total of maintenance charges also includes the interest on money invested in the truck, the depreciation of its value specified in the guarantee and the salary of the garage superintendent appearing under Overhead Charges, All Cars.

Allowance Made for Each Truck

The total of the first group of items makes up the expenditures allowed by the company normally for every truck. To this garage repairs and overhead expenses, including the wages of the various employees, are added, making up, with the cost of accidents and insurance, as well as light, heat and power, the total expense charged to the car. The total mileage traveled by the truck during the month, the daily average mileage, also the total operating cost per mile and the ampere-hours per mile are recorded on this sheet.

The grouping of expenses in Fig. 6 under two classifications, maintenance and operation, corresponds to the financial scheme introduced by the Gimbel company for its delivery department. Gimbel Brothers allow this department a fixed expenditure including the items named under maintenance, driving energy, average part in the salary of superintendent, lost interest in the investment and depreciation of the truck. The classification of these expenditures as allowed is due to the fact that they may be closely calculated beforehand. On the other hand, operating expenses which include garage repairs and expenses, light, heat, power, accidents and garage wages may not be calculated closely in advance; these figures, therefore, call for even greater attention of the auditor and efficiency managers than the items of the first group, and it is they that are subject to continued attempts toward a reduction.

Besides the extent to which the drivers, foremen, mechanics and shop men are involved in the handling of the cost-keeping blank, and which is incidental to their principal work, two persons are required to handle this system in the office, to segregate the time and cost records and to put them in a shape in which they may be easily referred to. The men in charge of the delivery system are positive that the latter, although it seems elaborate to outsiders who understand nothing of the handling of such a big organization, pays very well; or, rather, as the delivery trucks and the garage are necessary parts of the department store business, the best thing possible is to conduct these parts of the organization as economically as possible. That this is being accomplished in the case of Gimbel Brothers' system is beyond doubt. Of course, there is more than one detail of great importance in the successful handling of such a system. One of the principal points is that the stockroom clerk or man is absolutely exact and reliable and does not permit of any material leaving his department unless on a requisition. Likewise, waste time must be guarded against in every field of the work to make success complete.

Drivers Co-operate with Company

To court all-around alertness of their employees and increased activity in all departments, Gimbel Brothers encourage their workers in every respect. They induce them to do their best, by making it clear to them that by doing so they help both the firm and themselves. One of the aims evidenced in the company's inside policies is to keep its employees content, remembering that the personal welfare is a considerable factor in the work done by any individual. At the same time no attempt is spared to educate every man or woman working for the company so as to impregnate him or her with a certain becoming dignity which is bound to make a good impression on the patrons of the store. This is proof of the fact that men in whose hands the enforcement of high operating efficiency lies, view the matter in an entirely practical light and consider system merely as a means to an end, and not as an end in itself, as is the case with less broadminded managers.

Cure for Slipping Cone Clutch; Kerosene Not a Good Non-Freezing Solution; Five Cylinders Defended—National Company Makes Own Rear Axle—Some Remarks on Carbon Trouble—Volumetric Efficiency Explained

Leather Clutch Slips on Hill

EDITOR THE AUTOMOBILE:—My car, which used to be very good on hills, now fails me in this respect. There is a hill which I used to pride myself that I could take at 20 miles an hour on high. Now if I attempt to climb it on high the motor speeds up while the car slows down and I am forced to change gears. A friend of mine has told me that this is due to my clutch, but I doubt this as it has never given me trouble and I have had the car three years. In order that you may explain the difficulty to me, however, should it be the clutch, I will state that it is a leather-faced cone with flat springs placed beneath the leather to give a gradual engagement when throwing on the power.

Pittsburgh, Pa. N. T. FUCHS.

—A leather-faced cone clutch will slip when it becomes covered with oil or glazed. The trouble is due to one of these two causes. Should it be due to the oil the remedy is to have some one pull down the clutch pedal, or you may block it down with a piece of wood, while you pour a pint or so of gasoline over the surface of the leather. This will cut away the oil and leave you clutch. An alternative of gasoline is fuller's earth, which is sprinkled over the surface of the leather, absorbing the oil. The gasoline leaves the surface of the leather cleaner than does the fuller's earth, and hence it is better. Should the clutch be dry and glazed, the surface may be again softened by the application of a thick coating of castor or neats foot oil. Another frequent cause of the slipping of a leather cone clutch is the fact that the leather is worn down and exposes the head of one of the copper rivets. This gives a metal-to-metal contact of the clutch seating and hence causes a slip. The remedy for this is to either rivet below the surface of the leather or to replace the leather itself should it be worn too far.

Kerosene a Bad Cooling Agent

Editor THE AUTOMOBILE:—We would like to know if there is any reason why kerosene oil cannot be used with better results than other agents for cooling a gasoline motor in an automobile. Do you know of any objections to its use for this purpose?

Pierson, Iowa. G. P. MCGRAW.

—The use of kerosene in the radiator as a combination non-freezing and cooling agent is an annual suggestion. It is the opinion of many who have studied the matter that while it might be a success in the very far north, it is a failure in our latitudes. In the state of Iowa there are occasional warm days even in the winter. During these periods a motor would tend to overheat readily because the kerosene would evaporate quickly and because the specific heat of the kerosene would not permit it to carry away the necessary heat of the combustion chamber per cubic foot of fluid circulated. Kerosene also rots the hose connection. It cannot be mixed with water and possesses an unpleasant odor at high temperature. For these reasons it is unsatisfactory.

Still Prefers Five Cylinders

Editor THE AUTOMOBILE:—In your issue of Nov. 28 Mr. G. C. Richards calls attention to two objections to the use of five-cylinder motors, the first being that the five could not possibly produce as steady a torque as the six, and the second that the manufacturing cost of a five-cylinder crankshaft would be greater than that of a six. Granting that both these objections are well founded, it is still the writer's opinion that they are of secondary importance and that no good and sufficient reason has yet been put forth why five cylinders would not constitute a successful motor, which would be far superior to the four, even if it did not equal the six in the continuous torque which could be obtained.

Mr. Richards himself says that he found a five-cylinder "much superior to a four." He points out that a five would not operate without a flywheel. Granted. But do not all gas engines use comparatively heavy flywheels, irrespective of the number of cylinders?

I fail to see why the five would not give practically if not theoretically a continuous torque, since the explosions would overlap each other to the extent of 72 degrees on each revolution of the crankshaft, while in the four they do not overlap at all.

As to the greater expense of a crankshaft with five offsets instead of three, I submit that dispensing with the sixth cylinder, with all its accessories, would more than make good the cost of the five shaft over that of the six shaft.

To sum up the advantages of the five-cylinder motor as compared with the six:

1. The five would be less complicated.
2. It would weigh less.
3. It would require a shorter hood.
4. It would consume less gas and oil.
5. It would cost less to manufacture.
6. It would operate with less vibration and a steadier pull or torque than any four-cylinder motor that can be built, and I am confident that it would lose little if any advantage in these features when compared with a six.

Has THE AUTOMOBILE any information regarding acetic acid as a carbon remover or spark plug cleaner?

East Canaan, Conn. D. C. CANFIELD.

—Acetic acid is a solvent of organic substances and will aid in breaking up carbon deposits as will acetone, another product of dry distilled wood. A few drops of gasoline, however, will thoroughly clean a spark plug.

Distribution Affects Traction

Editor THE AUTOMOBILE:—I have noted your comment on the subject of traction. I think you do not fully grasp the facts. The friction coefficient's importance practically disappears when the load is all on the driving wheels. Friction is needed when there is a load to push. But a load can be carried with practically no friction. Put on roller skates and try to push a load in front of you. You cannot do it unless you get friction by

placing the skates more or less crosswise. But throw that load on your shoulders and you skate away with it just as freely as if you did not carry it. The folly of present automobile construction is that the motor and heavy mechanism is generally at the front where it is hard to propel and where it causes slipping of the rear tires with consequent skidding and faulty steering.

Surely you can see that a four-wheel drive does not have much bother with skidding or lack of traction. Then why should a two-wheel drive if its drive wheels carry all the weight? And it can carry so nearly all of it as to remove most of the troubles.

The cars of the future (whether far or near I do not know) will carry its main load on the drivers. I doubt if it will be a four-wheel drive because this adds needless complication. But it may and likely will be a three-wheeler because this drives two-thirds of the wheels which may carry most of the weight and need very little friction to push the lightly loaded front wheel. Why people will continue to skid into trees and telegraph poles and kill themselves I do not know. Certain it is that they can buy cars practically free from skidding.

Saginaw, Mich. CHAS. E. DURYEA.

National Makes Own Rear Axle

Editor THE AUTOMOBILE—Will you please tell me who makes the rear axle housing brake drums and hubs for the National Motor Vehicle Manufacturing Company, of Indianapolis, Ind.? I would also like to know if the same people make the differential. I am not quite sure what year car I am trying to get the information for, but it is likely that this same make of housing has been used for the past 4 or 5 years on all cars made by this company in that same length of time.

Marlboro, Mass. H. E. M.

—According to the Poertner Motor Car Company, of New York City, which handles the National car in the East, the National company has always made their own rear axle while the gears are made according to National design by the Brown-Lipe Company.

Care of Fixed-Spark Magneto

Editor THE AUTOMOBILE:—Kindly advise me the best way to find defects in operation of a Bosch high-tension fixed-spark magneto. How to get to the bushing and points. If possible, show me some pictures of them. The care and how to adjust them.

Shreveport, La. OLD READER.

—Contrary to general rule, the best care the average owner can give a magneto outside of a drop of oil occasionally, is to let it alone. Fig. 3 shows the exterior of the Bosch fixed-spark magneto. The breaker box cover A can be removed by taking out the screws which hold it in place. This exposes to view the breaker mechanism, which is shown from detail in Fig. 1. The two platinum points may be dressed off with a very fine flat file should they be pitted. The points are then readjusted by turning up a long screw holding the lower platinum point. This adjustment should not be made unless absolutely necessary. The only other attention you can give your magneto is to put a drop of very fine watch oil into the two oil holes shown in Fig. 1 every month. In the illustrations used here, Figs. 1 and 3 of the variable sparks magneto should illustrate the point, since the construction is practically the same.

Carbon the Root of Trouble

Editor THE AUTOMOBILE:—Can you suggest a remedy for my car? I have a 1907 type XV Pope-Toledo and believe it has run over 20,000 miles. Cylinders and rings are in splendid shape. In fact, the whole machine shows excellent material throughout, but it doesn't seem to develop power as it should and will knock and pound and fire back when the spark is thrown off. A month after being overhauled, and after having the carbon cleaned off, it will have absolutely no compression. On those occasions it is very difficult to start the motor, especially after being hot. I have tried different kinds of oil and don't seem to be able to get away from carbon formation, which I think is the root of my troubles. I keep my valves in pretty good shape, although the exhaust valves pit easily. My compression is pretty high, although I believe there are several cars at the present day with just as much. Perhaps you are familiar with the construction of the Pope cars at that time and can help me out.

Do you think it would be advisable to reduce its compression?

Rocky River, O. A. MORTON.

—The fact that you are continually bothered with carbon trouble and that the compression in your motor is high shows the backfiring, etc., is due to nothing more than an accumulation of carbon. The carbon will become deposited in a conical heap upon the head of the piston or other points in the combustion space, and the result is that the apexes of these small cones become incandescent under the influence of the heat to which they are exposed. The gases in the cylinder, being under a high compression, are very easily ignited, hence the backfiring through the intake manifold is due to the fact that the mixture is sometimes ignited as it is rendering the cylinders, causing the fire to penetrate into the intake manifold.

The proper cure is not the frequent removal of the carbon, but the removal of the cause of carbon deposit. The principal causes of this are: 1—too much oil; 2—poor ignition; 3—bad-fitting piston rings; 4—failure to drain out old oil in crankcase. These may be taken up individually and the proper steps for removing these causes pointed out.

1. This is due, in splash-lubricated cars, to the fact that there is too much oil in the crankcase and hence the connecting-rods dip too deeply and throw too much oil up into the cylinders. The cures are: 1—the shortening of the scoops on the connecting-rods; 2—filing the sides of the troughs which contain the oil so that they will overflow earlier; 3—the installation of a baffle plate in the lower part of the cylinder, which will prevent the oil from working its way up into the combustion chamber. This baffle plate takes the form of a common angle piece bent in a circle around the lower end of the cylinder. The vertical flange is fastened to the cylinder wall below the bottom of the piston stroke by means of small screws, while the horizontal flange forms the baffle. It is necessary, of course, to cut two slots in the baffle plate to permit the connecting-rod to work without striking same. In all these cures it is necessary to be extremely cautious so as not to cut down too far the supply of oil to any cylinder, as the results of this would be far more serious than an over-supply of oil. In other words, the changes made in the length of the scoops or the depths of the troughs should be

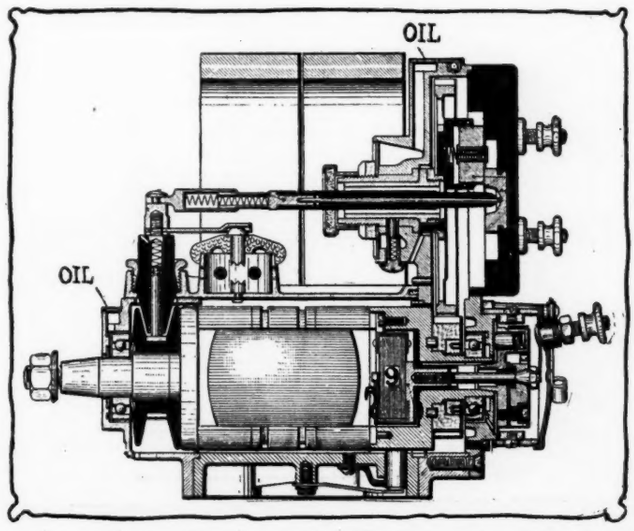


Fig. 1.—Section through Bosch magneto with two oiling points indicated

very minute at first and enlarged only after experiment. The baffle plate should be small at first, and made larger only if it is seen that the supply of oil which reaches the cylinder could be still further curtailed.

2. Poor ignition may cause carbon trouble indirectly. Whenever a misfire occurs a certain amount of oil which would otherwise be consumed by the heat of combustion is permitted to remain in the combustion space. Should the misfire endure for five or six explosion strokes of this particular cylinder and then be followed by an explosion on the succeeding stroke, the large quantity of oil which would be deposited in the combustion space during the strokes upon which the misfire occurred would be partially consumed, leaving a heavy black residue of carbon which would be deposited on the cylinder walls, the piston head and other spots, where it would be likely to cause the premature ignition as explained above.

3. Ill-fitting piston rings cause carbon deposits because they allow the oil to get by the piston and up into the compression space. The accumulation of too much oil in the combustion space causes trouble in the matter pointed out under 2. The cure for this is to replace the worn rings in the same manner that the cure for 2 would be in going over the ignition, locating the seat of trouble and removing it.

4. In the circulating splash system the common mistake made by many automobilists is the failure to drain out the old oil in the crankcase. This is no doubt due to the fact that it is rather unpleasant work, necessitating crawling under the car and removing drain plugs or opening up drain pipes that are rendered inaccessible because of the presence of the mudpan. Removing the mudpan itself and replacing it is no little work in itself. Oil which is circulated through the lubricating system of internal combustion motor becomes charred and waxy, rendering it after a time unfit for cylinder lubrication. For this reason it should be made a rule that the old oil be drained out thoroughly and the crankcase flushed with kerosene oil every 1,000 miles before the new supply of oil is put into the crankcase.

Meaning of Volumetric Efficiency

Editor THE AUTOMOBILE:—What is the meaning of volumetric efficiency, and has it any relation to mechanical efficiency in an internal combustion engine?

Bronxdale, N. Y. GUSTAVE MITTENZWEI.

—In a gasoline motor the piston never draws in as much gas as is represented by the volume of its displacement. The amount of air or gas actually drawn in in one stroke divided by the actual displacement of the piston is equal to the volumetric efficiency. The volumetric efficiency decreases as the motor speeds up, and also varies directly with the size of the inlet valve. It is affected also by the valve timing and the temperature of the cylinder walls. The Society of Automobile Engineers in the transactions for January, 1911, reports a paper presented by Professor R. C. Carpenter showing that a Franklin 4 by 4-inch air-cooled motor fitted with 1.375-inch diameter poppet valves, opening 5 degrees past upper dead center and closing 30 degrees past lower dead center, had, when driven by an electric motor at 1,000 revolutions per minute, a volumetric efficiency of 82 per cent. At 1,500 revolutions per minute the volumetric efficiency dropped to 68 per cent. When run under its own power with the same valve timing the volumetric efficiency at 1,000 revolutions was 68 per cent. with applied phosphor bronze cooling fins, and 62 per cent. with cast-iron integral ribs. At 1,500 revolutions per minute the percentages were 63 and 56 for the phosphor bronze and cast-iron ribs, respectively. This shows the effect of the cylinder-wall temperature on the volumetric efficiency, as the engine was old when run by the electric motor, and was cooled to different degrees by the phosphor bronze and cast-iron ribs.

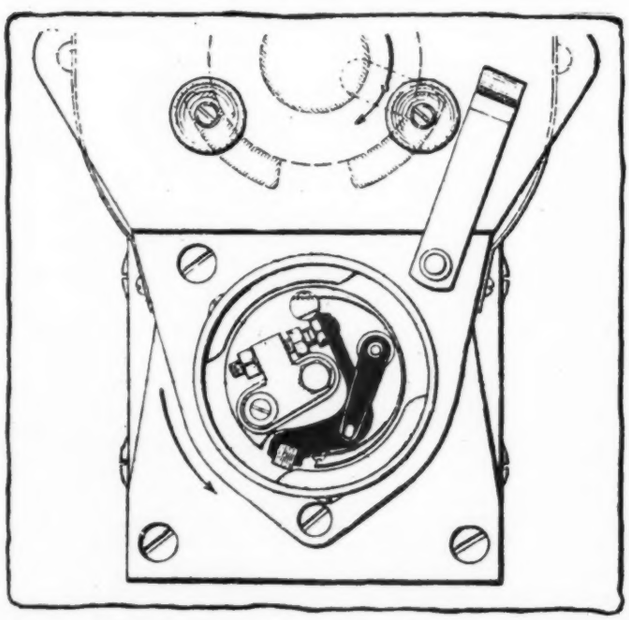


Fig. 2.—A view of the breaker box. The black shows the moving parts

Correct Temperature of Vulcanizing

Editor THE AUTOMOBILE:—Would you please tell me to what temperature rubber should be raised when vulcanized? Is there a wide range of temperature or should it be held within 1 or 2 degrees of a given heat?

Holyoke, Mass. B. Z. CRUGER.

—The correct vulcanizing temperature ranges between the limits of 250 and 300 degrees Fahrenheit. There are thermometers on the market which are just graduated through the range used in vulcanizing and which are of good use in this connection. Many of the patented vulcanizers are so designed that the temperature cannot rise above what is proper for vulcanizing. This is necessary because where the temperature gets above 320 the rubber structure is broken down by what may be called a form of destructive distillation, while below the vulcanizing range the action is not thorough enough to give good results.

Underinflation Causes Tire Cracks

Editor THE AUTOMOBILE:—I have recently bought a second-hand car upon which the tires were stated to be in good condition. Upon close inspection of the casings I find that the walls are filled with a series of cracks. Would you please tell me if this is due to any fault in the tires or because the former owner of the car did not give them proper care?

Houston, Tex. P. P. MOORE.

—The cause of cracks in tire casings is underinflation. If you will keep tires pumped to a pressure equal in pounds to 20 times the cross-section dimension in inches you will have no trouble. Assuming that your tires are 4 inches in diameter the correct pressure would be 80 pounds, or, for a 4.5-inch tire, 90 pounds, and so on through the gamut.

The Best Non-Freezing Solution

Editor THE AUTOMOBILE:—Would you please tell me the solutions that are commonly used in preventing the water from freezing in the radiator.

Detroit, Mich. CARL SCHNEIDER.

—In the issue of October 24, the question of non-freezing solutions was fully taken up and the merits of all the solutions was explained. A digest of the remarks in that issue follows:

—There are three well-known anti-freezing compounds which have been used extensively and which have proved themselves to be valuable for this work. They are alcohol, glycerine and calcium chloride. Besides these there are many others that are

good, but they nearly all have some drawbacks that prevent them from being as useful as would otherwise be the case.

About the most popular of all the solutions to use in the motor is the alcohol. Wood alcohol or denatured may be used. The cost is small; denatured alcohol may be purchased for 60 cents per gallon and the price of wood alcohol is about the same. The advantages of alcohol are that it is very easily handled and that there is no action on the metallic parts of the circulating system.

Taking wood alcohol alone the following solutions may be used:

Freezing Point	Wood Alcohol	Water
+ 5 degrees Fahrenheit	20 per cent.	80 per cent.
0 " "	25 " "	75 " "
— 5 " "	27 " "	73 " "
—10 " "	31 " "	69 " "
—15 " "	35 " "	65 " "
—20 " "	38 " "	62 " "

When using denatured alcohol the freezing point will be different. In tabular form for temperatures between 5 above and 20 below zero Fahrenheit, the denatured alcohol solutions will be as follows:

Freezing Point	Denatured Alcohol	Water
+ 5 degrees Fahrenheit	24 per cent.	76 per cent.
0 " "	29 " "	71 " "
— 5 " "	32 " "	68 " "
—10 " "	34 " "	66 " "
—15 " "	37 " "	63 " "
—20 " "	40 " "	60 " "

Glycerine possesses many characteristics which would seem to stamp it as the ideal non-freezing agent. The boiling point is high and, as many experiments have proved, does not change the boiling point of the mixture regardless of the percentage added to the cooling water. Glycerine reduces the freezing temperature materially when added to the water, but does not do so as rapidly as wood or denatured alcohol.

When reducing the freezing temperature to such an extent that the water will not freeze in a cold climate it is necessary to add so much that the water tends to become gelatinous and for this reason it has been mixed very often with wood or denatured alcohol in a very successful attempt to combine the merits of the two. When glycerine alone is used the mixtures that are required for different temperatures will be found in the following table:

Freezing Point	Glycerine	Water
+28 degrees Fahrenheit	10 per cent.	90 per cent.
+15 " "	30 " "	70 " "
+ 5 " "	40 " "	60 " "
0 " "	48 " "	52 " "
— 5 " "	54 " "	46 " "
—10 " "	58 " "	42 " "

When the glycerine and alcohol are used together they are used in equal quantities. This mixture, which is purely mechanical, has not as great a tendency to rot the hose connections as a pure glycerine solution would have. It has more water in it than would the latter and is thus more free to pass through the radiator and other parts of the circulating system without doing harm. On the other hand, there will be less alcohol in this solution than there was in the pure alcohol solution and the result of this is that there will not be so much evaporation and necessary replacement of the cooling fluid after the motor has been run for a time. The glycerine and the alcohol are stirred up together and added to the water in the following proportions:

Freezing Point	Mixture	Water
+20 degrees Fahrenheit	15 per cent.	85 per cent.
+15 " "	20 " "	80 " "
+10 " "	24 " "	76 " "
+ 5 " "	27 " "	73 " "
0 " "	29 " "	71 " "
— 5 " "	30 " "	70 " "
—15 " "	32 " "	68 " "

We now come to calcium chloride, $CaCl_2$, and water. This compound has been recommended by many and is very good, although it has its dangers in the difficulty of securing the chemically pure article. In buying the calcium chloride for use in the cooling system of an automobile the crude article costing about 10 cents a pound should not be purchased. The chemically pure article costs about 25 cents a pound and is very satisfactory. The objections to the use of the material is its tendency to set up an acidic action in the radiator. Chloride of lime, which should be kept out of the radiator, is often a constituent of the commercial calcium chloride and care must be used in getting the chemical from a reliable concern which will guarantee the purity of its products. With the calcium chloride solution the percentages are given by weight instead of volumes as are the other tables:

Freezing Point	Calcium Chloride by Weight	Water by Weight
+10 degrees Fahrenheit	15 per cent.	85 per cent.
+ 5 " "	17 " "	83 " "
0 " "	19 " "	81 " "
— 5 " "	21 " "	79 " "
—10 " "	22 " "	78 " "
—15 " "	23 " "	77 " "
—20 " "	25 " "	75 " "

The above is reproduced from THE AUTOMOBILE of November 21 in order that it may reach many automobilists who at this time of the year are very apt to be careless. The weather is down below the freezing point in nearly all the Eastern States at this time of the year and to leave the radiator without some non-freezing solution is to court disaster. All the mixtures mentioned in this list are practical and have been given the stamp of approval by a large number of motorists.

Caught With Short Fuel Supply

Editor THE AUTOMOBILE:—I wish to relate my experience of last summer, when an excessive grade found me short of gasoline and remote from supply. A party of us were making the Sonora Pass, leading over the summit of the Sierras at an elevation above 9,000 feet. We came to a short, steep grade which shut off the gas. It was near lunch time and 40 miles from a garage. We lunched and talked over the predicament. I finally suggested that we detach the feed pipe from the tank and place it in a perpendicular position from the carbureter. This was tried, and, much to our satisfaction, it would hold enough juice to place us safely over the grade. This may help some other man in a like predicament.

Gardnersville, Nev. W. M. MAULE.

—It is good to turn around and back up in a case of this kind. Another expedient which is sometimes resorted to under these circumstances when the road is too narrow to permit of turning around to back up the incline consists of closing the gasoline pipe at the bottom of the carbureter and then filling the float chamber of the carbureter. One filling will generally enable the car to reach the summit of the hill.

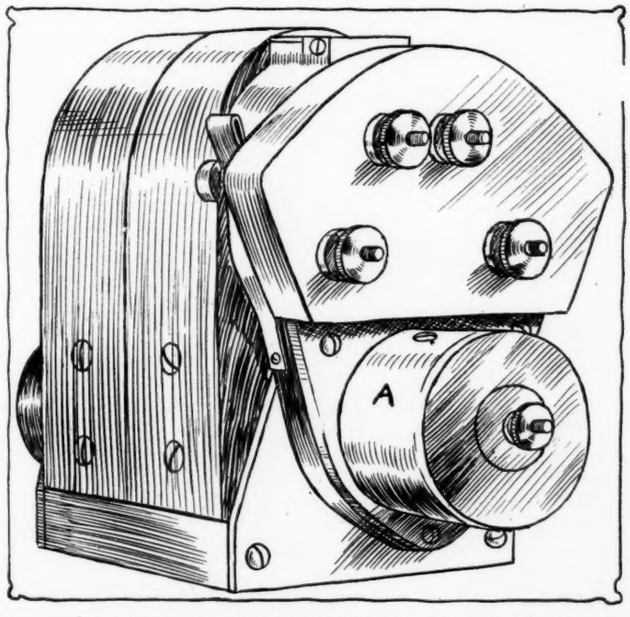


Fig. 3.—Exterior of the fixed spark magneto showing cap A to be removed

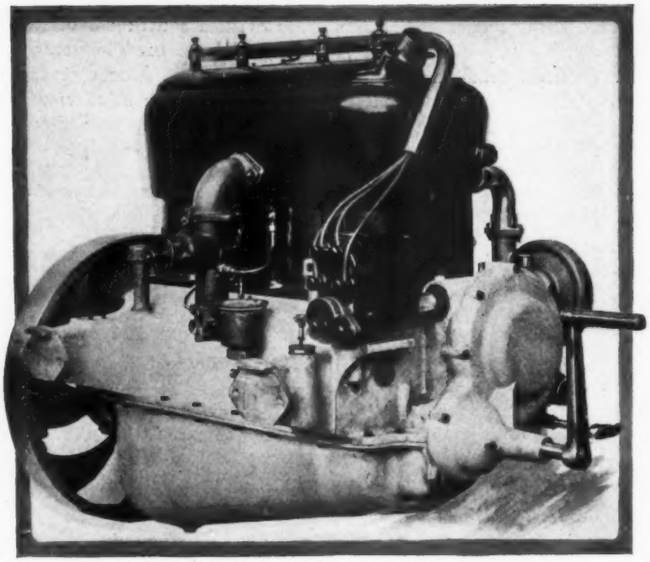


Fig. 1—Carbureter side of the new model 55 four-cylinder motor

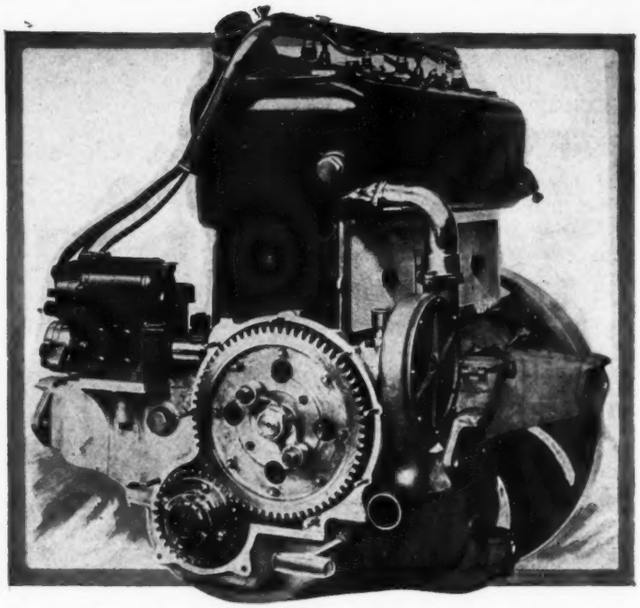


Fig. 2—Timing gears and magneto mounting of the new Fiat motor

Four-Cylinder Model Added to Fiat Line

Three Models Now Turned Out at the Poughkeepsie, N. Y., and Turin, Italy, Factories Are Identical

Italian Engineering Staff at American Factory Insures Uniformity—Stampings Imported from Parent Factory

FOR next season the Fiat company from its American factory at Poughkeepsie, N. Y., and its foreign factory, Turin, Italy, will market three chassis types, two fours and a six, namely: Model 54, four-cylinder, 110 by 150 millimeters or 4 2-5 by 6 inches bore and stroke; Model 55, four-cylinder, 130 by 170 millimeters or 5 1-8 by 6 3-4 inches; and Model 56, six-cylinder, the same bore and stroke as Model 54. These three models represent different years of Fiat development, in that the small four Model 54 was brought out 2 years ago, Model 56, the six, last year, and the new model 55 for next season. All three chassis are alike in general details, showing that the principles of construction in the Fiat factory were well outlined and settled several years ago.

The American factory turned out its first car in October, 1910, and since that time has been producing Fiat models of the same design as those made in Italy. The parent company furnishes the engineering staff, working drawings, and some of the materials and parts. The processes of construction are identical in Poughkeepsie with those in Turin, an Italian engineer living at the American factory to be certain that every detail of the foreign factory is incorporated in the American product. Several of the parts of the American car are imported from Italy, an example being the steel stampings constituting the housing for the rear axle and torque tube, which come direct from the patent factory. The materials entering into the other parts of the cars are of the same analysis as those prescribed by the Fiat engineers in Italy.

The Fiat motor, a block casting, in the four and six-cylinder models is shown in Figs. 1 and 2, these being reproductions of the new Model 55. The design is simplicity throughout, having as cardinal merits the block casting, inclosed valves, and the transverse forward shaft driving the pump and magneto. The carbureter is located on the non-valve side and connects with the casting through a brief elbow, the remainder of the intake manifold being within the water-jacketed casting, thereby guarding against mixture condensation.

The aluminum two-piece crankcase is a product of the factory foundry at Poughkeepsie, as are the gearbox and other aluminum castings.

Fig. 5, end and side sections of the motor, shows the compactness, due to the use of a block casting. This casting for the six-cylinder car has an overall length of 37 inches, is 13.75 inches high, and 11 inches wide. In the Model 55, the large four illustrated, the casting has an overall length of 28.5 inches. Bo : elevations show how the engineers have aimed at avoiding parallelism in the interior water-jacket walls, and also show the efforts at W to adequately water-jacket that part of the casting adjacent to the valve stems. At W1 is shown the intake manifold crossing between the second and third cylinders and also showing its water-jacketing.

Silencing the Valve Action

Every care has been used to obtain quietness in valve actuation, and also the maintenance of this. In Fig. 4 is shown the valve system. Each valve is a three-part one made up of an 18-20-point carbon steel stem, a 30-35 per cent. nickel steel head, and the beveled portion a cast iron ring. This has been done to give the necessary strength in the valve head, and also that freedom from pitting on the beveled seat which is obtained by cast iron. The seats are beveled to 30 degrees instead of 45, this being done to give a quicker and wider opening. Valve tappets are hardened and ground and small allowances used between the tappet T and its guide G, the permissible allowance being .004 millimeters minimium and .006 millimeters maximum over or under size. The camshaft has cams mounted by keying and pinning on the shaft, the cams being in pairs, intake and exhaust for each cylinder. By using detachable cams it is possible to use non-split bushings for the shaft.

On Model 55 a compression release is used, this taking the form of raised cams integral with the regular cams. To use these it is necessary to slide the camshaft endwise. and to make this possible without moving the timing gear, the shaft carries a two-arm yoke driver Y on its forward end, and this driver connects with the timing gear through a pair of hardened and ground pins S which the gear carries. These pins are of greater length than the driver thickness so that when the cam-

shaft is moved forward, the yoke slides on them. The driver has hardened and ground bushings. The movement of the shaft is effected by a collar C into which works a conventional yoke operated through a pull lever extending to beneath the radiator.

In mounting the transverse shaft driving the magneto and pump spiral gears have been used. The shaft, Fig. 3, is carried on two races of ball bearings with a thrust. It has its driver G formed integrally, and meshes with a bronze gear. The teeth are cut at 45 degree angle. The shaft couples with the magneto and pump by flexible coupling K. The drive is entirely inclosed, and is well lubricated. This illustration shows a compact coupling in connection with the magneto drive, which is carried from front to rear through the motor crankcase. From the breaker box a vertical link L enters the crankcase arm and transmits through a cross-lever L1 to the horizontal shaft S extending to the rear of the crankcase, where there is a short coupling to the control parts on the steering column.

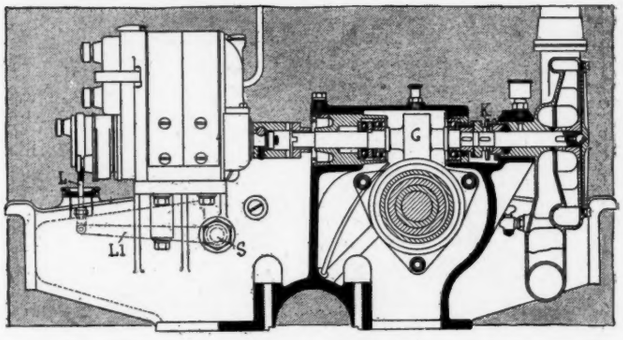


Fig. 3—Ball bearing magneto and pump drive used in Fiat cars

Chrome Nickel in Crankshaft

Every care is used in the manufacture of the moving parts. The crankshaft in all models is of chrome nickel alloy carried on three bearings in the four-cylinder models and four in the six. It is hollow to facilitate force-feed lubrication, not only to the lower connecting-rod bearings, but also to the wrist pins. The crankcase is heavily webbed internally and to insure adequate rigidity reinforcing plates are used to support the bearing caps, these plates being carbon steel forgings held by four alloy steel studs.

Lubrication is force-feed and non-splash. A small gear oil pump mounted on the rear end of the camshaft raises the oil from the reservoir and delivers it to a horizontal copper pipe inserted during the casting process in the crankcase, of which it extends from end to end. Branches lead from this duct to the three main bearings. From these bearings the oil flows through a drilled crankshaft to the crankpins and thence through copper pipes attached to the connecting-rods to the wrist pins. To prevent an excess of oil being misted into the cylinder from the throw of the crankpin, integral baffle plates are formed in the top of the crankcase. The crankcase has a capacity of 4 to 5 gallons.

An interesting detail is the mounting of the oil pump on the rear end of the camshaft. Its position is shown in Fig. 6, as

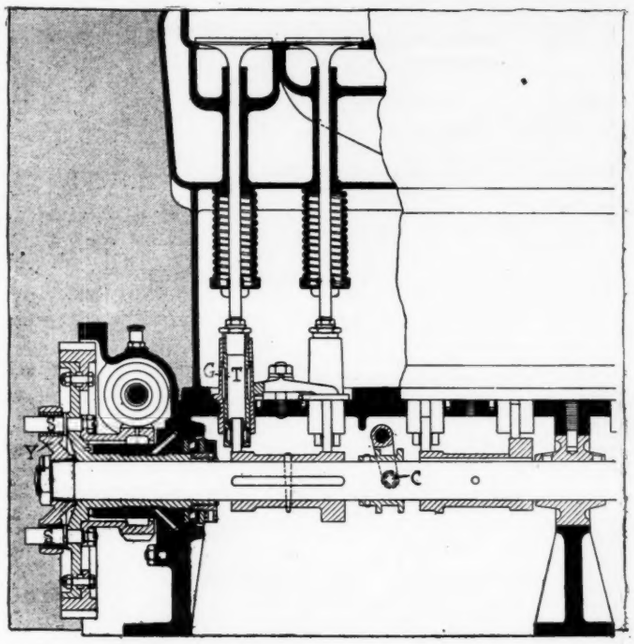


Fig. 4—Camshaft and valve lifter mechanism in partial section

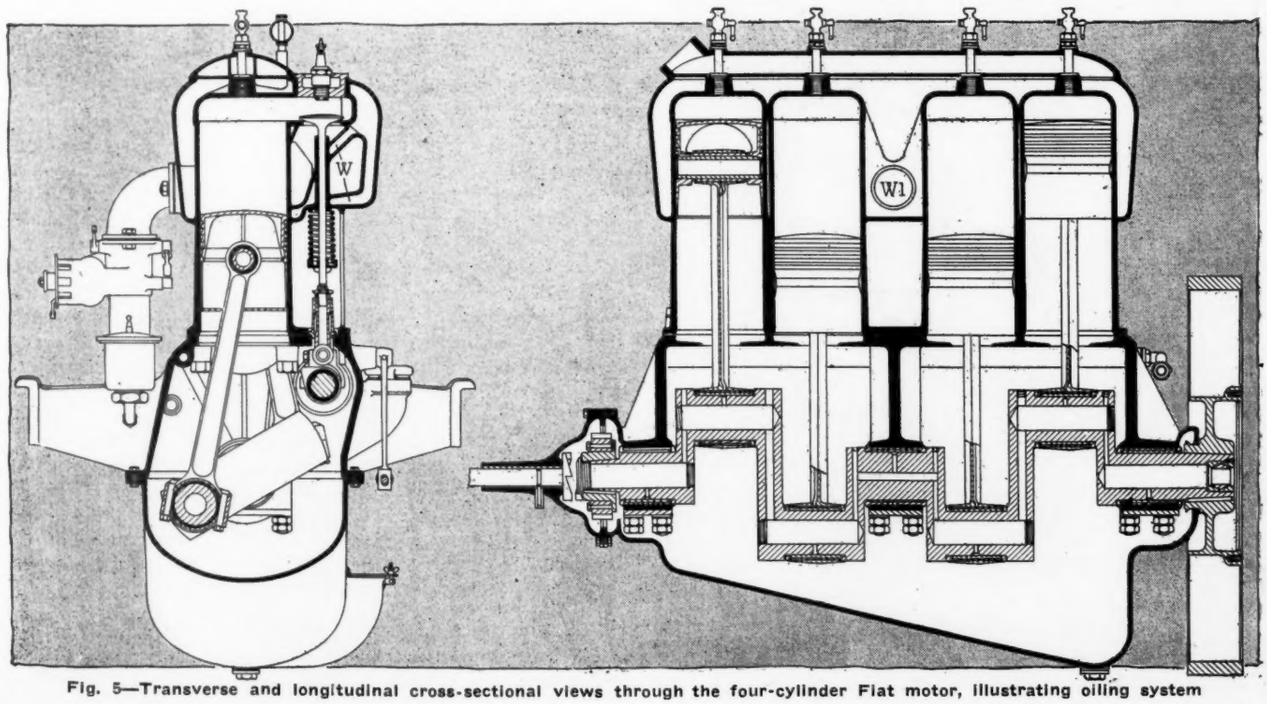


Fig. 5—Transverse and longitudinal cross-sectional views through the four-cylinder Fiat motor, illustrating oiling system

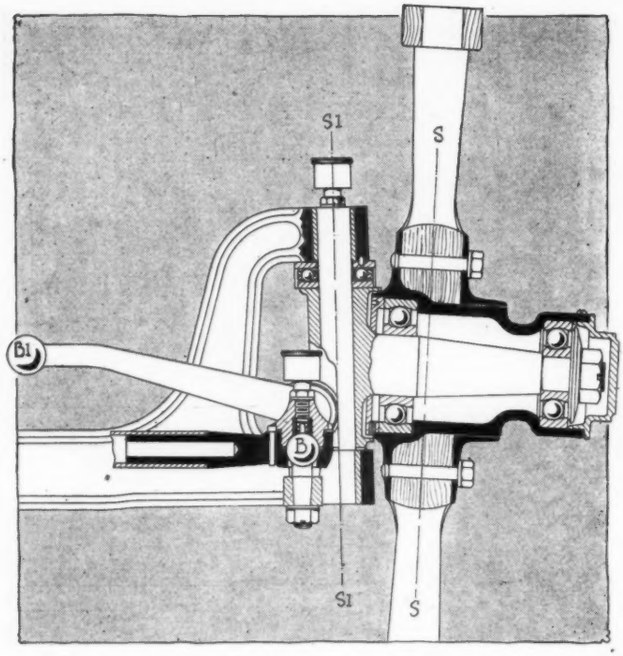


Fig. 6—Ball bearing steering knuckle and spindle. Note wheel slope which is measured by the converging lines through the center of the steering knuckle and of the road wheel designed to give minimum tire wear and easy steering

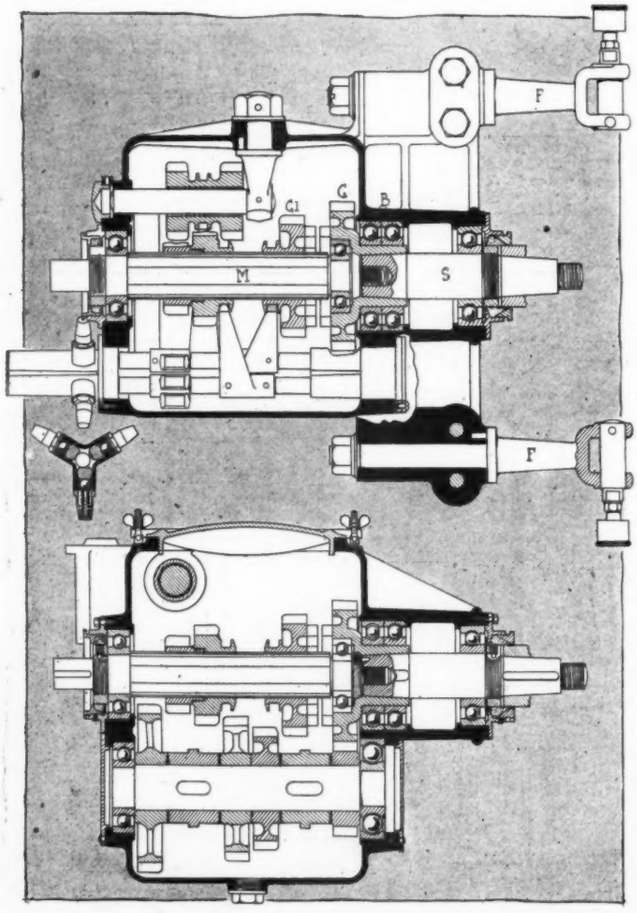


Fig. 7—Sectional plan and elevation of the Fiat gearset, showing the arrangement of the shifter dogs and the mounting of the shafts on single and double ball bearings. The mainshaft extends practically throughout the length of the case

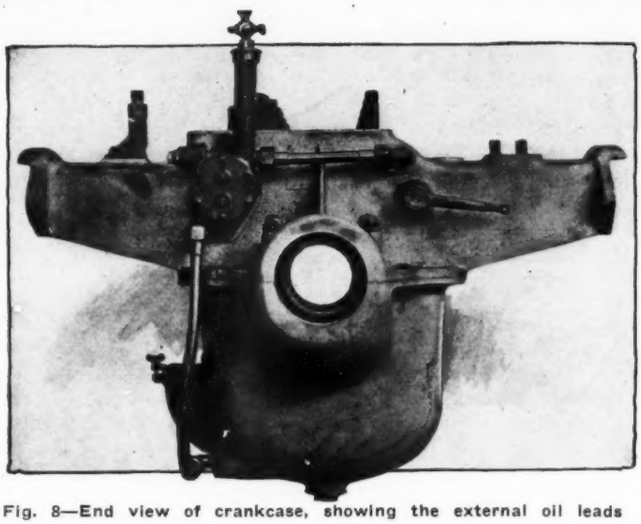


Fig. 8—End view of crankcase, showing the external oil leads

well as the vertical pipe through which it lifts the lubricant from the reservoir and the short horizontal pipe through which the oil flows to enter the copper tube extending from end to end of the crankcase. In Fig. 3 the master gear G of the oil pump is shown attaching direct to the end of the camshaft K, through a hole drilled in the end of the shaft. Into this hole the nut is threaded, this nut having a square center to receive the shaft of the gear. The oil pump housing bolts direct to the end of the crankcase. By this unique coupling the necessity of additional gears or shafting to drive the oil pump is eliminated.

For convenience the Fiat transmission system may be considered in three units, the multiple-disk clutch, the four-speed gearset and the combined rear axle and torque tube. The multiple-disk clutch, Fig. 10, consists of sixty-five steel disks in sets of thirty-two and thirty-three. The carrier C mounted on the forward end of the shaft connecting with the gearbox is insured of alignment in that the forward end of the shaft extends into the recess in the crankshaft and is supported through a spherical bushing B in turn mounted in another bushing B1 threaded into the end of the crankshaft. This gives a ball-and-socket support. The prevention of oil leaking from the clutch housing is dependent upon a packing P. The company furnishes two other types of packing for this position, both illustrated and designated P1 and P2.

Compact Four Speed Gear Used

The four-speed gearbox Fig. 7 is especially compact, measuring 10 inches from the center of the front bearing to that of the rear. The gearset is a reverse design over that in common use, in that the mainshaft M, which connects with the clutch, extends practically throughout the length of the case, and the stubshaft S protrudes through the rear and couples by universal joint with the propeller shaft. Shafts and gears are of alloy steel and supported on seven ball bearings, there being three braces supporting the stubshaft, a double race B immediately in rear of the integral gear G on this shaft, and a single race 3 inches further to the rear and mounted in a continuation or neck of the gearbox. The mainshaft has four integral splines and carries two sliding units.

The gearbox is a two-part aluminum casting, with the mainshaft mounted in the top portion, and the bearings for the countershaft located between this and the bottom part. The top is a large coverplate. The opposing faces of halves of the gearbox are milled to prevent oil leaks. The gearbox has a heavy horizontal web at the rear in which are carried the two forgings F forming the trunnion supports for the yoke of the torque.

Adequate packings for the prevention of lubricant leaking from the gearbox are mounted at both ends of the mainshaft. these packings being held by a threaded nut. The lubrication of

the gearset is looked after in every detail to the extent that the reverse gearshaft has a spiral oil groove cut in it and the reverse gear is fitted with a bronze bushing. Supporting the rear end of the mainshaft in a ball bearing within the gear G facilitates lubrication at this point.

The rear system is not illustrated or described herewith, but is the subject of a special article in a succeeding issue. This axle is a special Fiat design in which the housing for the axle and propeller shaft is made from two stampings bolted together. One stamping forms the upper half and the other the bottom half.

Ball Thrust on Steering Knuckle

In the running gear the Fiat rigid frame construction is used throughout, it having the side members very heavily flanged in the region of the dash, and tapering gradually fore and aft. The front axle is noteworthy in that the design of the steering knuckle is to reduce tire wear. Fig. 6 shows the center line S of the wheel which toes in, and line S1 marks the center line of the spindle toeing slightly out so that these two lines intersect at the point where the tire rests upon the ground. This gives the minimum tire wear, and easy steering. Easy steering is further obtained by the use of ball-and-socket joints B at both ends of the tie-rod connecting the knuckles, as well as at B1 the end of the arm which connects to the steering mechanism. The car weight is carried on a ball thrust bearing beneath the upper jaw of the knuckle, and grease-cup lubrication is fitted wherever necessary.

Without allowing these lines to intersect at the ground, the front tires are subject not only to greater wear but every road shock is transmitted to the driver's hand through the steering mechanism. The reason for this is that every time the front wheel hits an obstruction it creates a turning moment about the steering knuckle due to the small lever arm, which is equal in amount to the distance between the point where the center line produced strikes the ground and where the vertical diameter of the wheel strikes the ground. This turning moment is transferred from the road to the driver's arms through the medium of the steering mechanism.

For the first time the Fiat company has scheduled a full equipment on all models this season. This includes mohair top, windshield with rain vision, Gray & Davis generator, and dynamo for electric lights, speedometer, clock, Klaxon horn, Q-D demountable rims, trunk rack, tire irons and other body essentials.

All three models have a standard line of bodies including seven-passenger touring types in curved panel or flush-sided styles, five-passenger phaeton, convertible roadster, limousine, and laundalette. The wheelbases measure 123, 128, and 135 inches respectively, on the three models.

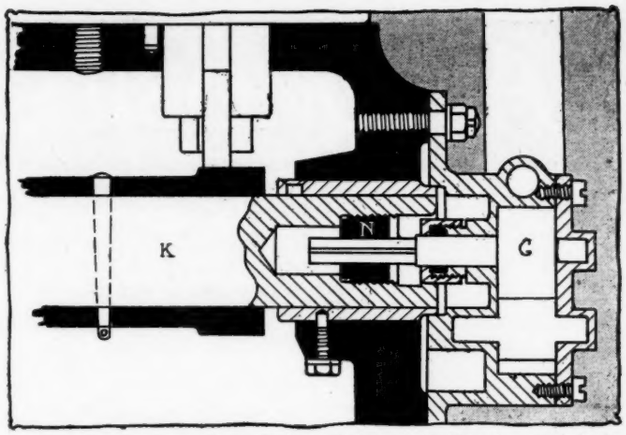


Fig. 9—Oil pump gear G, of the oil pump attached to crankshaft. Note the compression release combined with the cam, keyed upon the crankshaft by a tapered pin

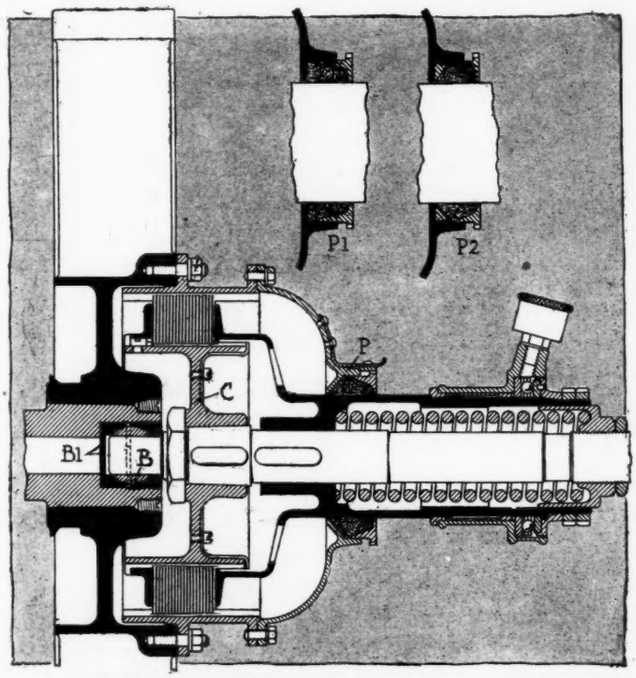


Fig. 10—Fiat 65-disk clutch. Note insertion into crankshaft end to secure alignment. Above are shown two views of the stuffing box fitted to prevent oil from working out of the clutch housing

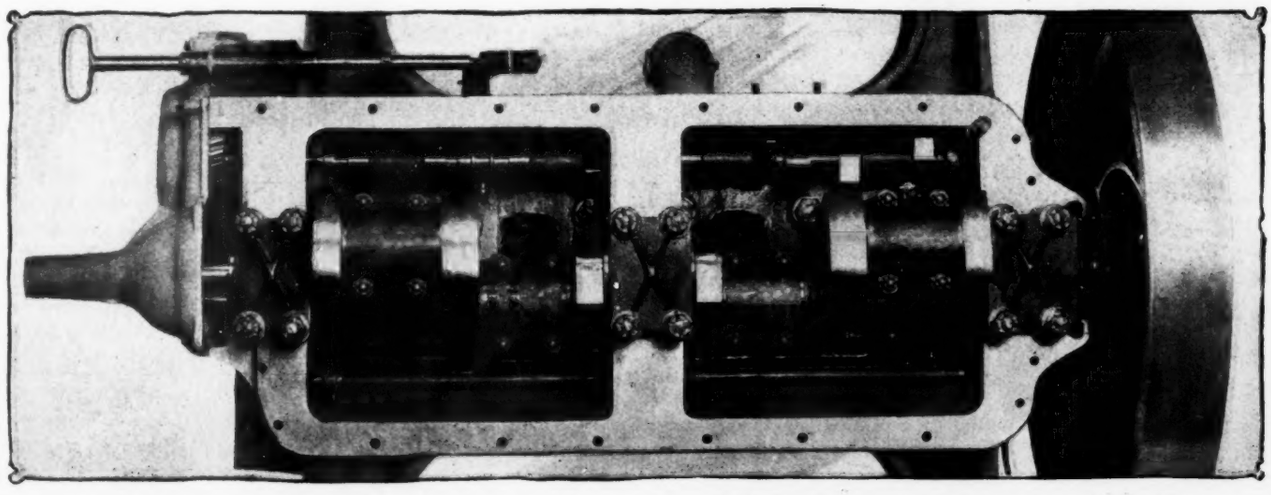


Fig. 11—Looking down into the crankcase casting of the Fiat model 55 four-cylinder motor which uses non-splash oiling

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Sane Legislation Needed

MASSACHUSETTS, by recent action of one of its courts, has instituted a new ruling in the use of the highway by motor vehicles, and it is now imperative for an automobile to pass a street car on the left side when on the highways of the state. The feature of the decision lies in classifying the trolley car with horse-drawn and motor vehicles using the road. Heretofore it has been customary to pass trolley cars on the right side but the injury to a person alighting from a trolley car by a passing automobile has resulted in the new decision.

Today Massachusetts is in a worse predicament because of this decision than it was before. There is more danger to the public, embracing those who use the highway, by compelling motor vehicles to pass street cars on the left than there was in passing them on the right. This decision has brought the impossible into the limelight. Frequently on highways the street car does not occupy the center of the highway, being closer to the left side than to the right, in which exigency there is nothing for the motorist to do but keep back of the trolley car, stop when it stops, slow up when it slows up and do everything in general to congest traffic by the reduced pace.

It is almost impossible to conceive how long legislatures will continue to legislate against motor cars in use on the highways without any apparent regard for others who use these highways. Pedestrians and automobilists have equal privileges on the highway, yet when the person alighting from the trolley car is warned by the automobilist's horn but walks backward into the automobile, the courts apparently see only the automobilist and the legislatures begin more campaigns against motorists without the slightest effort to control the pedestrian in any way whatever.

It is true that pedestrians are directly responsible for a great many accidents in which automobiles figure. The pedestrian entirely ignores the rules of the highway, often failing to look to the right or left when starting to cross a street or highway. Such is not rational use of the highway in spite of the law that both the pedestrian and the vehicle user have equal rights thereon. It would be more beneficial if legislatures took up the question of pedestrian control chiefly within the limits of incorporated cities and towns. In our big cities millions of dollars are lost annually because of delays at crossings occasioned by the pedestrians not observing the rules of traffic at city street intersections. In New York in several sections an effort is being made to control such pedestrian traffic. A similar effort is to be instituted in Chicago. The great value of such an effort will be the habit that will be established in the minds of the pedestrians. The traffic control by policemen at street intersections has got automobilists into the habit of observing such regulations whether the policeman is on hand or not. Contrast this with the pedestrian who feels that dozens of times every day he is disregarding the police control, by crossing streets contrary to traffic rules where policemen are in control. Such a pedestrian becomes a law unto himself or herself so far as crossing streets is concerned. He or she fails to start crossing the street in the proper mental frame of mind that is necessary in these days of increased automobile traffic. The only way to correct this, in other words to secure the proper mental attitude, is by rigid regulation, regulation by the police. This and only this will result in proper regard for other street traffic by pedestrians.

Many cities have legislation today forbidding passing a stationary trolley car, one stopped to take on passengers or let others off. Such a regulation is necessary in cities with narrow streets, but the abuse of such an ordinance is working ill in several cities today. Such regulations are increasing street congestion, which in itself offers a fresh difficulty, and it is questionable if it would not be much better to call for a slow cautionary pace for automobiles passing standing trolley cars and arrest for violation, than to insist on the full stop, which invariably adds to the noise of the city and requiring higher speed to overtake the trolley and pass it.

The automobile is modern transportation, it is here to increase annually in numbers and in use. It will be on the city streets as long and perhaps longer in many places than the trolley car. The city officials should recognize this and legislate accordingly. It is just as important for pedestrians alighting from a trolley car to look back of them before beginning to walk to the sidewalk as it is for an automobilist to observe traffic rules at street intersections. The pedestrian must do his or her part. The police must do their part in educating the pedestrians, and when this is done accidents will be reduced and traffic congestion be relieved to a considerable extent.

Co-operation the Solution of Traffic Problems

James S. Marvin, Traffic Manager of the N.A.A.M., Covers Subject from Practical and Academic Standpoints in Paper Presented at Recent Convention in Detroit—Industry Pays $6,000,000 a Year Freight

THE development of our railroad systems has been rapid and has made possible our present industrial development; both are dependent on each other, and the manufacturer relies on reasonable efficiency at all times of the carriers which serve him; if the schedule between his factory and a certain market is 3 days, his business is tuned acordingly and he expects the schedule to be pretty closely maintained and that there will be cars available when he is ready to ship.

Now let us consider the situation of the automobile industry in its relations to railroads with respect to service. We have first to realize that the automobile, itself an article which is entering very largely and is destined to take an increasing part in the solution of this question of transportation, has nevertheless presented a new problem in freight transportation for the railroads. **I refer to the fact that the ordinary box car is useless for automobile service for the reason that the door openings will not admit any but the smaller machines; therefore, if the freight equipment of the railroads today was the same as 10 years ago, the development of the industry would have been impossible so far as dependence upon the railroads for transportation is concerned; aside from a few old-fashioned carriage cars and open cars, the transportation facilities for automobile factories would have been little better than if we had no railroads at all!**

This is an aspect of the situation that is not always realized; nevertheless it is fact that to keep pace with the development of this industry, railroads have departed from their old-time methods of designing door openings in freight cars to the extent of about 50,000 box cars, valued at perhaps 60,000,000, without which it would have been impossible to ship any but the smallest machines completely assembled.

It should not be understood, and I do not mean to say, that the railroads built these cars for the exclusive use of automobile shippers, or that the cars are of such a nature as to render them unfit for other freight service; **what I do desire to bring out is that the automobile industry is particularly susceptible to serious effects from freight blockades, because the factories cannot draw from the million and more box cars in general service,** but their shipments are confined to and are dependent upon these 50,000 automobile cars that are circulating around the country and are mixed in with all other kinds of freight cars.

The nature of the automobile business is such as to scatter these 50,000 cars in about as effectual a manner as could be devised; the factories are spread over a wide territory and each one ships to every section of the country. The problem of keeping these automobile cars moving back into the automobile manufacturing territory would be simplified greatly if outlying railroads gave closer observance to the rule requiring return of freight cars to the home road, as the automobile cars would come back with the others, but this rule, unfortunately, is not always enforced.

When industries in general find it difficult to secure sufficient freight cars, the situation is rendered all the more difficult for automobile factories, for when a car shortage occurs shippers of other articles gain the use, to a large extent, of automobile cars.

Such a shortage exists in this country today; the railroads are right now taxed to the limit of their resources in handling the exceptionally large crops and a heavy movement of traffic of all kinds. One of those periods exists at this time when the return of freight cars to the home roads is difficult of enforcement, and when it is considered that the observance of this rule is all that the automobile industry has to depend upon for the shipment of its goods, the real aspect of the situation confronting us is apparent.

To shippers of other articles which can be loaded in ordinary box cars it does not matter so much if the car which they load is owned by the railroad furnishing it to them, but the automobile shipper hasn't this choice, and must, in the main, depend upon the outlying railroads returning the initial lines' automobile cars. We have not, therefore, depended entirely on the railroad companies' rules. The traffic department has adopted many measures tending to co-operate with those rules and point out to railroads throughout the country the necessities of this particular industry and its dependence on the proper handling of automobile cars after they are made empty by dealers. To the tracing of the owning roads we have added our appeals to the outlying railroads that this equipment be given loads only such as will take the cars back to the manufacturing territory, instead of sending them to points entirely out of line.

In the belief that a full understanding of the situation on the part of automobile dealers throughout the West and South would be of assistance, we have outlined the situation so that the factories could explain it to their dealers and the latter to their local railroad people.

The advantage of using automobile cars for hauling supplies and material to automobile factories has been explained and encouraged, and we have called attention of our members to the necessity of keeping every automobile car actively in service by loading and unloading promptly and refraining from tying them up by loading in large quantities to dealers who cannot accept drafts and as a consequence would leave the automobiles in freight cars at destination a considerable time.

There are few more important questions confronting the business interests than these periods of car shortage which seem bound to recur under existing conditions. A general and far-reaching interruption of traffic contains possibilities not only of financial disaster, but of actual privation and suffering. There seem to be times when the methods in vogue on the part of railroads and on the part of shippers invite such results. The facilities and the regulations which are usually employed do not meet the requirements of a severe test, and business suffers.

The business of a factory sometimes grows at a gratifying rate, and the receiving and shipping facilities which were at first ample are perhaps not developed at a corresponding pace. An undue burden is sometimes put upon the railroads which serve the plants, whereby several shifts per day are necessary when one at first was sufficient.

Olympia's Doors Close on Most Successful Show

by J. S. Critchley

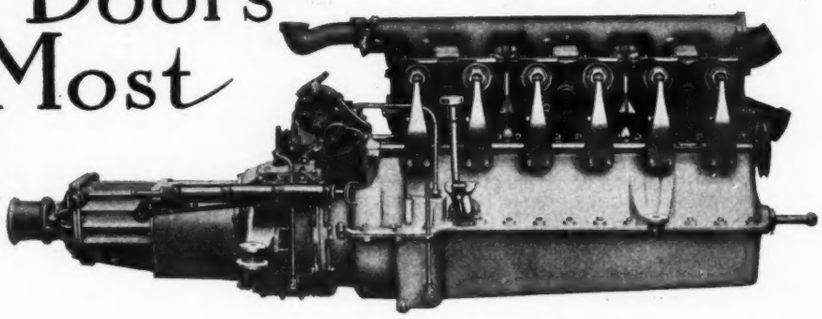


Fig. 1—View of the Lanchester six-cylinder motor, showing side valve levers

LONDON, Nov. 16—(*Special to* THE AUTOMOBILE)—The Olympia Show, which closed its doors today, has been an unparalleled success as regards the attendance of the public. At least 45,000 more people have visited the show this year than last, and over-crowding has been so severe that it has interfered with business to a considerable extent. On the days when the prices of admission have been raised to 5 shillings, and half a crown, the crowds have been even greater than on the days when the price was 1 shilling only, the reason of this being that people who really want to see things have selected the higher-priced days to avoid the crush. Those who have attended to seriously study the constructions have been very much hampered by the dense crowd. Among the manufacturers considerable dissatisfaction has arisen from the fact that the members of the Royal Automobile Club are admitted on presentation of their membership tickets. This has been the regulation ever since the show commenced. It is thought, however, that if members of the Royal Automobile Club were charged for admission there might be a little less crowding. Seeing that the club has only some 7,000 members, it is doubtful if this would make any appreciable difference, as probably not more than 1,500 of the members visit the show simultaneously.

One of the difficulties in getting to some of the stands is due to the fact that they are surrounded by the agents of the various concerns. In many cases thirty to forty agents will be dispersed round their firm's exhibit, and, as the stands are comparatively small, it is obvious that in many cases they are over-burdened with attendants.

The attendance has been greater than ever as shown by the following statistics:

	1910	1911	1912
Friday	10,954	12,539	14,322
Saturday	25,843	27,890	34,672
Monday	33,511	22,132	26,989
Tuesday	24,160	19,291	24,393
Wednesday	38,115	38,748	48,879
Thursday	29,728	36,765	39,739
Friday	27,292	39,832	33,476
Saturday	29,305	28,898	32,648
	218,908	226,095	255,112

Probably the private sales have never been less than this year, and this is entirely due to the inability of the purchasers in some cases, to even get to the stand they wish to visit. The provision of a bigger hall is every year more necessary, as the show has completel outgrown the capacities of Olympia.

Lanchester Improves on Details

The Lanchester company is making no changes in cylinder dimensions or horsepower. The two cars constructed by the Lanchester company are a four-cylinder, 4-inch bore and 4-inch stroke, and a six-cylinder of the same dimensions. The motor is shown in Fig. 1. There are, however, improvements in detail, one of which is rather notable. The object of this improvement is to render the four-cylinder engine as smooth in its running as the six-cylinder and to do away with engine vibration. This anti-vibrator consists of two spindles running at right angles to the crankshaft, and at twice its revolution. The spindles are provided with balance weights, which do not exceed 12 pounds. At high revolutions these balance weights tend to compensate the unbalanced force of the motor.

A self-starter is also fitted to one of the models. This is of the electric type. The dynamotor is driven by an inclosed silent chain from the rear end of the countershaft. The dynamotor charges a 32-volt accumulator, an 8-volt current being provided for for lighting purposes. The starting is effected by sliding the gearshaft and intermeshing gears between the forward end of the armature shaft and the flywheel of the motor. Coupled to the self-starting control lever is an arrangement for retarding the ignition simultaneously. Fig. 1 illustrates the six-cylinder engine and gear.

Benz in Remarkable Test

Practically no change has been made in connection with the Benz productions. The 12-30 Benz with a bore of 72 millimeters and stroke of 120, is a car which has achieved a considerable amount of notoriety on account of its efficiency. The car is very speedy and on a trial at Brooklands ascended the 1 in 4 grade with four passengers at a speed of 11 miles an hour. The dimensions of the car are as follows:

Length of frame from dash	8 ft. 2 ins.
Breadth of frame	2 ft. 6 ins.
Wheel base	9 ft. 6 ins.
Wheel track	4 ft. 2 ins.
Overall length of complete car (hood down)	14 ft. 6 ins.
Overall width of complete car	4 ft. 9 ins.
Height of complete car (hood and screen down)	4 ft. 6 ins.
Weight of chassis	14 cwt.
Weight of complete car	20 cwt.

The engine cylinders are cast monobloc with water jackets and internal gas passage forming an integral part of the casting. The camshaft is driven by silent chain with the valves in line. The cylinders are arranged over the crankshaft offset in the direction of rotation. The crankshaft is fitted with three bearings and is of specially large proportions enabling the engine to be run at very high speeds with freedom from periodic vibration. Lubrication is of the combined pressure and splash system, the end of the connecting-rods dipping into troughs which are fed from the overflow of the main bearings. Ignition is effected by the Eisemann self-advancing magneto, and the cooling system is on the thermo-syphon principle. From the flywheel the power is taken by means of a leather clutch fitted with springs beneath the leather. To effect easy changing of speeds a clutch stop is fitted, which is shown in Fig. 3. This consists of a disk working against two leather-faced adjustable pads. The shaft between the clutch and the gearbox is supplied with two universal joints. It will be noticed that there is no cramping of the various parts and that the removal of the gearbox or clutch is a comparatively easy matter. The gearbox is

fitted with four speeds, and is of the jointless one-piece casting type. Stuffing boxes are fitted to the shafts to retain the oil.

Power is transmitted from the gearbox to the rear axle by means of a propeller shaft completely inclosed in a tubular casing. Radius rods are fitted, and the back springs double shackled.

For the 1913 season the Germain company is producing the following models: 20 horsepower with Silent-Knight engine manufactured by the Daimler company, Coventry, Fig. 2; 15 horsepower with poppet-valve engine, monobloc cylinders; 14 horsepower, 18 horsepower, 20 horsepower, 28 horsepower with poppet-valve engine and separate steel cylinders with brass water-jackets.

It is interesting, in the first case, to notice that this company has adopted the Knight sleeve-valve engine. This engine has the following dimensions: Bore of cylinder, 90 millimeters; stroke of piston, 130 millimeters, and the R. A. C. rating is 20 horsepower. The lubrication of the reciprocating parts and journals is effected by the Daimler semi-mechanical system which insures an adequate supply of oil while preventing overlubrication and its attendant evils. The regulating device is inter-connected with the throttle regulator, the oil supply varying with the speed of the engine. The Zenith carbureter is fitted in conjunction with pressure feed. Cooling is effected by a worm-driven centrifugal pump, together with a radiator of ample capacity and a belt-driven fan. The ignition is by Bosch dual system with worm-driven magneto,

Long Pistons in 15-Horsepower Model

The 15-horsepower engine with monobloc cylinders is of particular interest and this engine will be described rather fully. In the first case the cylinder diameter is 80 millimeters and the piston stroke 140 millimeters, which is according to R. A. C. rating 15.9 horsepower. The pistons, though light, are exceptionally long—126 millimeters—and the cylinders are offset to the extent of 22 millimeters. It has been necessary to slightly slot the pistons on one side to clear the connecting-rod. The cylinder for the same reason has cast grooves on one side, a practice that is now common. Four piston rings are fitted, and this for pistons so small in diameter is somewhat unusual. The connecting-rods have a length of 290 millimeters and in comparison with the pistons are somewhat heavy. The crankshaft has three bearings, 70, 60 and 8 millimeters in length, respectively, the last mentioned having the bearing on the flywheel end. The diameter of the crankshaft at the two forward bearings is 40 millimeters and at the rearward bearing 45 millimeters, while the crankpins are 60 millimeters long by 40 millimeters diameter. It is noticeable that the camshaft chain-driven wheels are placed not at the forward end of the crankshaft, but at the back and near to the flywheel. Outside these wheels is a large ball bearing which is intended to support the weight of the flywheel. It seems that this is a position in which a ball bearing can be used with advantage for it would here receive little or none of the actual shock of the explosion. The crank wells are 20 millimeters wide against the bearings and the unsupported webs have a width of 26 millimeters. The front end of the crankshaft has a pulley to take a flat belt for fan driving.

Turning now to the camshaft, it will be seen that this has in all five bearings, three of them being plain journal bearings of large diameter and the remaining two ball bearings. The shaft has a diameter of 24 millimeters, and the cam width is no less than 25 millimeters, but this is partly due to the fact that no rollers are used on the tappets. There are two thimbles, one fitting inside the other; there is a long coiled spring, Fig. 13, that tends to separate them and thus to make up any slight clearance that may exist in the valve operating mechanism. The arrangement is very simple and should effect silence in operation.

Germain Spark Plugs in Novel Position

There is a small worm on the camshaft for driving the oil pump in connection with the lubricating system, which will be described. The valves are arranged upon one side of the engine and have a diameter of 40 millimeters, the ports and gas passages being very free. There are covers over the valve springs, tappets, etc., and these are attached in a simple manner. The igniting plugs are not over the inlet valves, a point that is now almost universal, but are screwed in to the opposite sides of the combustion chamber at an angle of about 45 degrees. Most tests that have been made with regard to plug position have served to prove that when the plug is placed in the pocket near the inlet valve a slow-running and elastic engine is most easily obtained; it is not easy, therefore, to see why in the Germain engine this practice has not been followed. In the position shown, too, the plugs would appear to lose some of the advantage of the cooling effect of the mixture as the electrodes are in a pocket some inches from the point at which the mixture enters, although the violent turbulence of the mixture will tend to clear the plug pocket to a great extent.

The water-jackets are carried well down the cylinders and the valve pockets and passages are very well looked after. There is a ribbed exhaust carrier having at one part of it a short hood for supplying warm air to the carbureter.

In connection with the lubrication it may be said that the oil is contained in a special sump or oil reservoir contained in the lower half of the crank chamber. This sump is of novel design, being fitted with a splash plate or baffle which prevents the oil washing over the edge into the crank chamber. The splash plate slopes towards a hole in the center after the manner of a funnel, thus allowing the return oil to flow into the sump. In addition to passing through the usual gauze filter, the oil is made to flow into a well in the center of the sump where any remaining sediment is separated from it by gravity. A perfectly

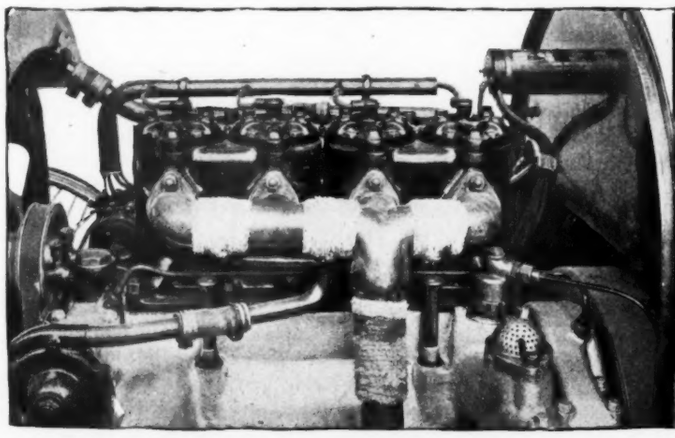


Fig. 2—Exhaust side of the 20-horsepower, four cylinder Germain motor

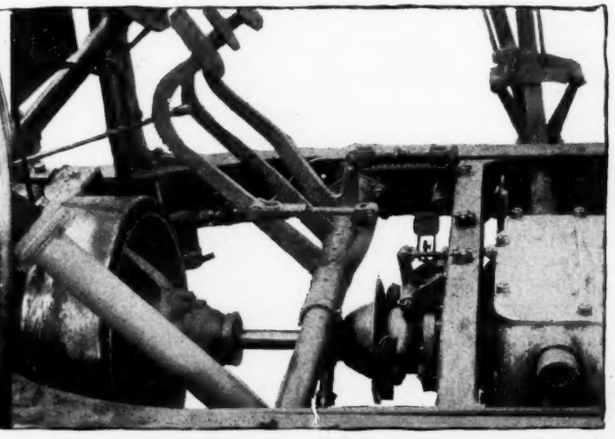


Fig. 3—View of clutch and control mechanism of the 12-20-horsepower Benz

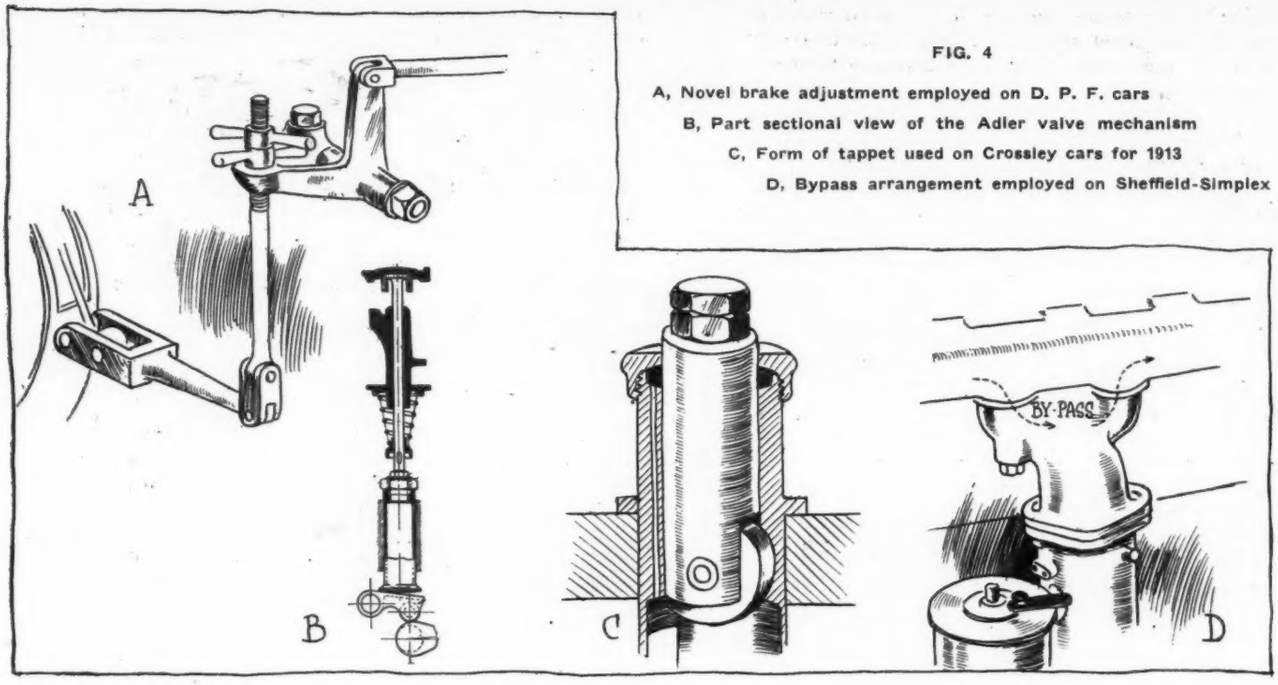


FIG. 4

A, Novel brake adjustment employed on D. P. F. cars

B, Part sectional view of the Adler valve mechanism

C, Form of tappet used on Crossley cars for 1913

D, Bypass arrangement employed on Sheffield-Simplex

clean supply of oil is thus obtained under all conditions and all possibility of the oil on the sump overflowing into the crank chamber and causing over-lubrication is entirely removed. The oil sump is approximately square in shape and has cooling ribs cast on its outer surface, which assist in keeping the main supply of oil cool and preventing its evaporation.

Fig. 13 shows an alternative type of tappet and it will be noticed that the principal difference between this one and the one described is that the coiled spring is replaced by a quantity of felt packing and that there are a series of thin steel washers contained in the bottom of the larger steel thimble. This is certainly a very novel feature and presumably would be more conducive to silence than the type of tappet previously described.

Felt Packing Makes for Silence

Presumably the felt packing will not only serve as a spring between the two thimbles, but will also in a great measure deaden or muffle any slight noise that might otherwise be due to some cause or other. It will be unnecessary, perhaps, to remind readers that felt or some very similar substance is used constantly to insulate running machines from the flooring to which it is bolted.

The engines of the other models retain for the most part the characteristic features of last year's designs. The cylinders are in every case of steel, machined from a solid forging, and surrounded by brass water-jackets, secured in a manner which makes any water leakage practically impossible. The use of steel for this purpose, although more expensive in manufacture, gives a cylinder which is entirely free from any danger of loss of efficiency through porosity, and one in which wear is reduced to a minimum. Also, the combination of this cylinder with a drawn-brass water-jacket of light gauge produces an engine far lighter than it is possible to obtain with cylinders of the ordinary cast type. The ignition is by Bosch magneto, an automatic advance device being included in the engine.

The new 20-horsepower model with separate brass jacketed cylinders of 92-millimeter bore and 150-millimeter stroke of piston has all the valves on the same side. The crankshaft is mounted on five bearings, that is to say, there is a bearing on either side of each cylinder. By reason of this the crankshaft remains exceptionally rigid under the heaviest loads. The lubrication system is similar to that employed on the other models, and a Zenith carbureter with pressure feed is also fitted. The ignition is by the Bosch D.U.4 type magneto, which includes an automatic advance device, and is driven, together with the water pump, from the camshaft by a worm gear.

The 20-horsepower Silent-Knight, 14-horsepower monobloc, 20-horsepower and 28-horsepower models are fitted with four-speed gearboxes, the other models having three speeds. In the 30-horsepower model, option is given of a three-speed box at a reduced price.

In the 14-horsepower, 18-horsepower and 28-horsepower models the inlet and exhaust valves are placed on opposite sides of the cylinders, the camshafts being operated by timing wheels of case-hardened steel running in an oil bath. These are finished by being ground together, and in this way perfect accuracy of tooth profile is obtained, and silent and efficient working assured. Forced lubrication is employed by means of a gear pump, worm driven from the camshaft, the oil being conducted to the main bearings through separate pipes, and thence to the big end bearings through holes drilled in the crankshaft. The Zenith carbureter, in conjunction with a pressure gasoline feed, is also used for these models.

A somewhat striking feature is the size of the brake drum; the diameter is more than 13.5 inches and the width of the brake shoe is 2.1875 inches. The drum has circumferential cooling ribs upon it, and owing to the comparatively high speed of the drum, these should be effective.

Crossley Continues Two Models

The Crossley Motors Company, Ltd., is making no radical change for the coming season, and is continuing to construct the two last year models, namely, 15 horsepower, 80 millimeters bore by 120 millimeters stroke, and the 20 horsepower, 102 millimeters bore by 140 millimeters stroke. The following are the features of these cars for 1913:

In the case of the 15 horsepower, the cylinders are cast en bloc, and in the 20 horsepower in pairs. The 15-horsepower engine flywheel pit and gearbox are on the unit system. In the case of the 20 horsepower the gearbox is independently supported in the chassis on two tubular cross-members. Both engines are cooled by thermo-syphon circulation, and both are lubricated under pressure, the oil pump being fixed on the casing at the front of the engine and driven directly off an extension of the camshaft, the oil being drawn by the pump out of the sump, and forced through the hollow crankshaft to the journal

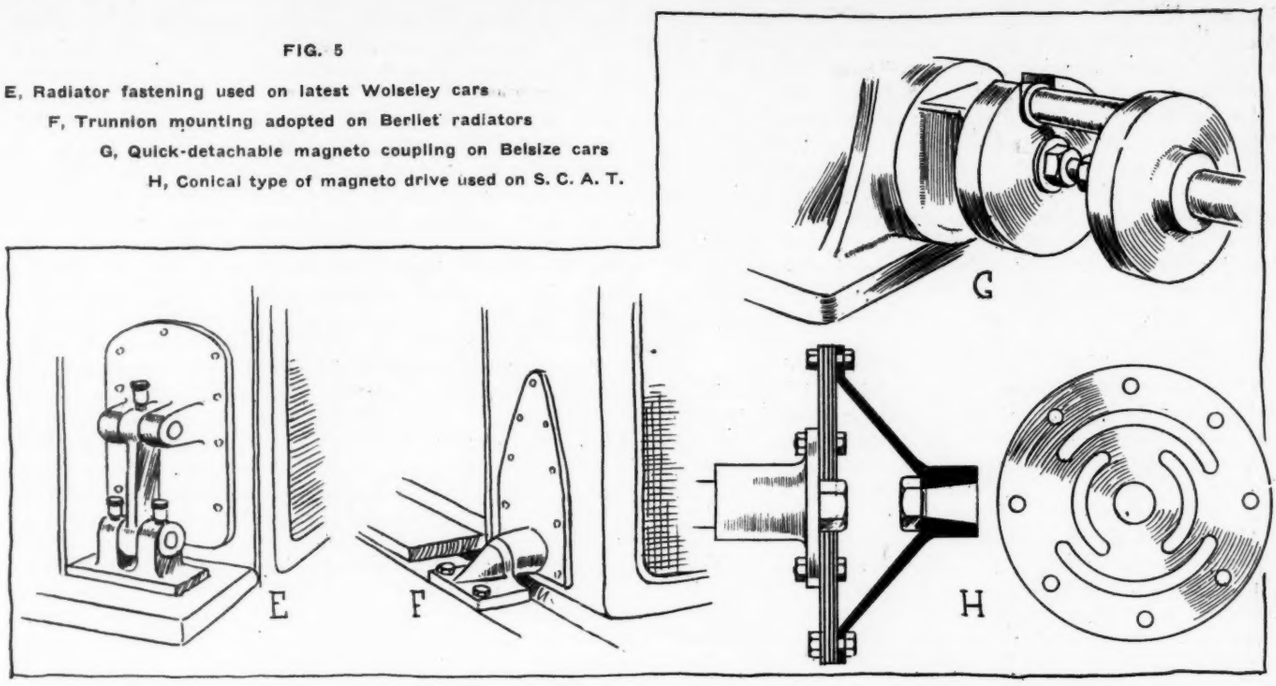
FIG. 5

E, Radiator fastening used on latest Wolseley cars

F, Trunnion mounting adopted on Berliet radiators

G, Quick-detachable magneto coupling on Belsize cars

H, Conical type of magneto drive used on S. C. A. T.



and big end bearings. The pistons are fitted with three rings above the wristpin and no scraper rings are provided. The earlier Crossley models were fitted with the dashpot arrangement on the valve risers, the object of which was to keep the valve stems continually in contact with the adjustable set-screw of the tappet plunger. It has been found, however, that the solid plungers, Fig. 4, without the dashpot are in every way as silent as the results obtained from the previous arrangement. Chain drive for the half-time shaft and magneto is retained.

Clutch Stop a Crossley Feature

The drive for the engine gearbox is through a leather-faced cone clutch. The clutch runs on a spigot forming the extension of the crankcase, and is of the internal type. A modification this year consists in adding a clutch stop. The universal joint of the ring type couples the clutch to the gearbox, the bushes and pins of the universal joint being fitted with ball non-return type lubricators which prevents the oil being thrown on to the bushes by centrifugal force. The gearbox remains exactly as before, and has four speeds and gate control. The features of the gearbox are the generous dimensions of the ball bearings, gear wheels and shaft. A feature in construction which differs from ordinary practice is the fitting of the keys of the sliding shaft after the shaft itself has been ground, in other words, the keys are not solid with the shaft. The advantage of this method is that the portion of the sliding shaft on which the change speed wheels slide can be made absolutely true by grinding; on the other hand, there is a chance of the keys working loose. Another feature of the gearbox is that the constant mesh wheel on the clutch shaft is supported by a ball bearing on both sides, and is thus not overhung. At the back of the gearbox there is the usual brake drum and universal joint connecting the gearbox through the propeller shaft. This universal joint runs in a spherical torque ball which forms an oil bath. The brake is of the two-shoe cam-operating internal expanding type, and the brake drum is ribbed for cooling purposes. The propeller shaft is entirely inclosed in a steel torque tube bolted on to the center casing of the rear axle. With regard to the rear axle, the differential is entirely removable through the lid at the back, and is provided with an adjustment for accurately setting the depth of the engagement of the main crown wheel with the driving bevel. The brakes and the rear wheels are also of the two-shoe expanding cam-operating type.

As in former years, the cylinders of the Sheffield-Simplex are cast in sets of threes and the valves are upon one side. The cams do not operate the tappets directly, but there are radius links upon which the cam rollers are mounted and the links are drilled to secure lightness.

The cylinder has a diameter of 89 millimeters and the stroke of the piston is 127 millimeters. There is a bearing between every crank and an exceptionally long bearing at the back end of the engine. The pipe arrangement on the valve side of the engine is very neat and compact, the exhaust pipe gradually increasing in area as it nears the back end.

Briefly, the points to be taken note of in connection with this model are: a double-dropped frame providing low carriage entrance without sacrificing maximum road clearance. Ordinary three push pedal type of control; Lanchester type rear springing; neatness of exhaust and induction piping on engine; thermosyphon with draft induced by fan flywheel; spherical bulged radiator; both foot and hand-operated brakes acting direct on to rear road wheels and all of the expanding type; the clutch is a multiple-disk type having a large number of flat plates; two independent sets of brakes are fitted, both acting upon large air-cooled drums on the back wheels; a special adjustment is provided for taking up wear without affecting the original position of levers on pedal; the live axle has a Lanchester or concave type of worm, and, finally, all important power transmitting parts are manufactured from a steel specially developed by a leading firm of Sheffield manufacturers, providing a hard-wearing surface and exceptional strength, as shown by the following results of an official test taken by the Sheffield Testing Works, Ltd.:

Tensile strength	122 tons per square inch
Elastic limit	115 tons per square inch
Elongation	11 per cent. in 2 inches

Vinot Has Chain-Driving Camshaft

The Vinot car represents one of the most satisfactory designs in European construction for a light medium-powered car. The firm specializes in two models, namely, a 12-14 horsepower, 70 millimeters bore by 110 millimeters stroke and a 15-20 horsepower, 80 millimeters bore by 130 millimeters stroke. With both the cylinders are cast monobloc, all valves in line and camshaft driven by inclosed chain. The magneto and pump are placed on the opposite side to the carbureter and driven from the camshaft. Lubrication is of the forced variety, both to the main

bearings and to the connecting-rods, the oil pump being driven on the camshaft by an eccentric. In connection with the oiling system the usual test cock is fitted to the base, but in addition there is provided a metal dipping rod which, when it is withdrawn, shows by notches cut thereon the amount of oil in the sump. A gauge of this description is also used by the De Dion company.

The clutch is of the leather type and is fitted with six semicircular plate springs between the leather and the face with bolts extending through the rim by which these springs can be adjusted. Further, the clutch can be so arranged that it can be dismounted without disturbing any other part of the mechanism. Between the clutch and the gearbox a universal joint is fitted.

Hexagonal Shafts Used in Gearbox

The gearbox is provided with three speeds, and the shafts are finished to a hexagonal section, which, it is claimed, is stiffer than a round shaft of the same weight. The primary shaft runs in three sets of ball bearings, two of these being placed at the forward end, which take up the pressure when the dog clutch takes up the direct drive on top gear.

A feature of the construction is in connection with the lubricating arrangement, a tube being carried from the trunnion to the outside of the frame where a grease cup is fitted. The grease cup is further arranged so that a grease pump can be screwed on to the end of the pipe. This is one of the small refinements demonstrated by the present show. All the greasers of the Vinot car are placed in accessible positions. With many cars in order to lubricate certain parts either the floor-boards have to be removed or it is necessary to attend to the grease cups from below.

The Adler valve is illustrated in Fig. 4. The characteristic feature of the construction of the valve is that from its seating it is extended in a cylindrical form. By this means the valve can be lifted before the gas enters the cylinder, and it can be moved more slowly than the ordinary constructed valve, and vice versa, the valve can be closed more slowly. This slow start and termination of the valve movements with simultaneous shutting off of the aperture affords the possibility of compensating the interstice between the valve tappet and valve stem, and further of placing the valve on its seat noiselessly. To this there is added the action of the roller lever, interposed between the cam and the tappet, which also effects the gradual starting and termination of the valve motion. The roller lever, which pivots on a fixed shaft, carries the tappet and has at its upper end the setscrew terminating in a hexagonal, which is secured by a nut after the adjustment of the required play between the tappet and valve stem.

The Adler clutch is of the leather-cone type internally operated. Beneath the leather, leaf springs are fitted at three points. A characteristic feature of this clutch is that it can be easily dismounted in the following way: The bolts coupling the clutch to the flange are first removed, after which the bolts are screwed up, which draws the spring case into the clutch cone. This reduces the distance between the flange of the flywheel and the flange of the gearshaft, so that the entire clutch group, with the clutch ring, can be taken out.

There is a by-pass in the Sheffield-Simplex exhaust pipe, Fig. 4, which carries a portion of the exhaust gases round the upper part of the inlet pipe of the engine.

The Wolseley radiator, Fig. 5, is not fastened direct to the frame, but is anchored by short arms pivoted at either end. Thus when one side of the frame rises somewhat higher than the other, the links allow for the movement and there is no straining of the radiators and consequently leaks are not likely to be developed.

The Belsize magneto coupling, Fig. 5, consists of two disks, one having a pin screwed into it and the other a notch or slot in which the pin engages. The coupling allows for a small amount of lack of alignment without any undue friction in the bearings.

To permit a certain amount of freedom to the Berliet radiator it is mounted upon trunnions, Fig. 5. Thus in the case of frame distortion the radiator is not strained.

Spring Drive Magneto on S. C. A. T.

The magneto spring coupling on S. C. A. T. cars, Fig. 5, consists of a series of circular steel spring plates fixed to the magneto driving shaft; these are cut out as shown in the end view of one of the plates. A cone-shaped casting is fitted on the magneto spindle and this is secured to the outer diameter of the plates. Thus a fair amount of flexibility exists. A similar type of coupling is used between the flywheel and the multiple-disk clutch casing.

The armature of the Bosch starting magneto is geared up six to one to the starting handle; it is, therefore, obvious that a very slow pull-up of the latter results in a fat spark occurring at the plug. It will be understood that the starting magneto is only

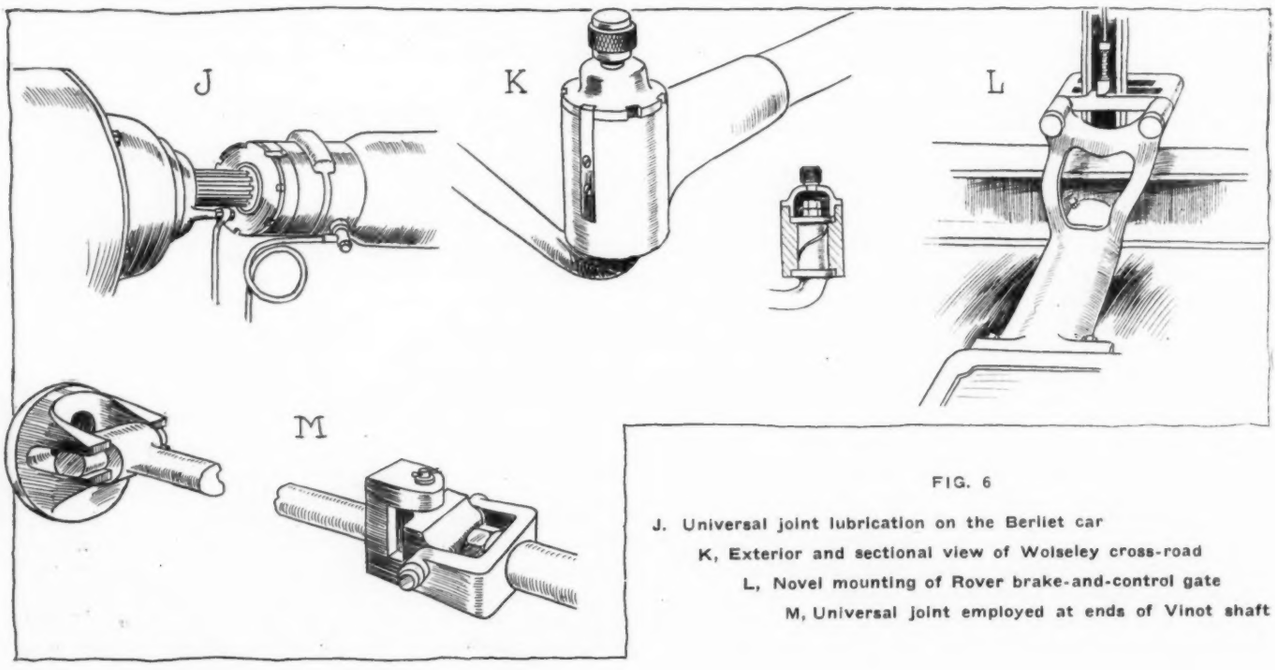


FIG. 6

J. Universal joint lubrication on the Berliet car

K, Exterior and sectional view of Wolseley cross-road

L, Novel mounting of Rover brake-and-control gate

M, Universal joint employed at ends of Vinot shaft

operated when the engine is actually being started, and remains quite passive in ordinary running. If the engine be just warm a casual turn in either direction of the starting handle is enough to set it in motion.

The Berliet universal joint, Fig. 6, behind the gearbox is novel because it is kept supplied with lubricant from the engine; the front end of the propeller shaft is serrated so that a telescopic joint is formed at this point in addition to the universal movement permitted by the main joint. The oil feed to the back axle is led into the front end of the torque tube in which the propeller shaft is supported by a ball bearing. The shaft itself carries a little worm wheel just in front of this bearing, which acts as a kind of turbine and throws the oil entering the tube, just in front of this wheel, onto the ball race behind it. Thence it reaches the bevel gear and differential casing by gravity.

Fig. 7 illustrates the fan drive and pump of the S. P. A. car. The fan is provided with a free wheel arrangement to take away jar should the gears cease to run. The pump body is cast integral with the cylinders from which the water flows directly to the jacket. The turbine pump is fastened to the same spindle as the fan.

Darracq clutch withdrawal gear, shown in Fig. 7, has two ball-bearing rollers having their axles vertical, which are fixed to the fork ends of the clutch disengaging lever.

The Crossley brake-rod adjustment, Fig. 8, provides a simple and handy method of lengthening or shortening the brake-rod, and a glance at the illustration will render any description unnecessary. The angular position of the Crossley brake lever can be altered by slacking the nut, shown in Fig. 8, and disengaging the serrations. When the nut is tightened the serrations provide a certain grip.

Clutch Pedal Geared to Shaft

Fig. 9 shows the clutch mechanism of the D. F. P. car. With this engine the clutch is of the internal type, and in order to get the necessary movement the clutch pedal is geared to the shaft carrying the clutch disengaging fork.

A feature of the Waverley car is its rear suspension, Fig. 10. Forward springs of the usual semi-elliptic type are used, but at the rear two quarter-elliptic springs are fitted at each side. These are superimposed and spaced about 4 inches apart. Nearly flat, they give ample vertical movement, and can act as torque and driving members without reducting their efficiency as springs.

Fig. 11 illustrates the brake adjustment on the four-cylinder Standard car, 89 millimeters bore by 133 millimeters stroke. With this brake adjustment the adjusting devices are brought outside the frame, a practice which makers are adopting, namely, Deasy, Maudslay and others. It will be noticed that there are two adjustments, one for the grip, the other for positioning the lower shoe. It is quite unusual to find these two adjustments provided for in this manner. The grip adjustment is effected by the wheel A, which is keyed to the shaft B. At the end of this shaft a bevel wheel is provided, gearing with a bevel on the screwed shaft C, the rotation of which draws the shoes together. The positioning arrangement is effected by the thumb screw D, which by means of the screwed shaft E raises the bell crank F upon the lower arm of which the lower brake shoe rests.

Argyll Collapsible Tank Filler

The Argyll filler for the gasoline tank, which is on the dashboard, is made collapsible, Fig. 12, thus the filling process is very much facilitated. A neat and simple form of quickly detachable cap is also provided and the action of this is clear from the figure.

The J. B. shackle bolt is turned from the solid steel bar and the head of the bolt is bored out to form the grease box. The brass cap is so constructed that it can be slipped on to the grease box with a gentle pressure. There are no threads, either on the grease cup or cap, so that the annoyance of a crossed or worn thread does not exist. Four little steel balls fitted in the cap operate in such a manner that no amount of vibration will allow the cap to move back.

To lubricate the bolt the grease cup and cap is filled in the ordinary way, then the cap is slipped over the cup and gentle pressure from time to time on the cap, as the grease becomes exhausted, will keep the bolt properly lubricated.

The Thompson-Bennett exhaust car heater consists of an aluminum box let in flush with the floor of the car and the heat is derived from the exhaust by diverting the gases into the heater and thence to the atmosphere. A heat regulator is attached so that the temperature can be graduated at will or shut off entirely if necessary. This valve can be operated on the heater itself. As an alternative an independent regulator can be supplied and arranged in any suitable position on any part of the automobile.

The heater is simple to fit. The exhaust pipe is tapped at any convenient place either before or behind the muffler. It is un-

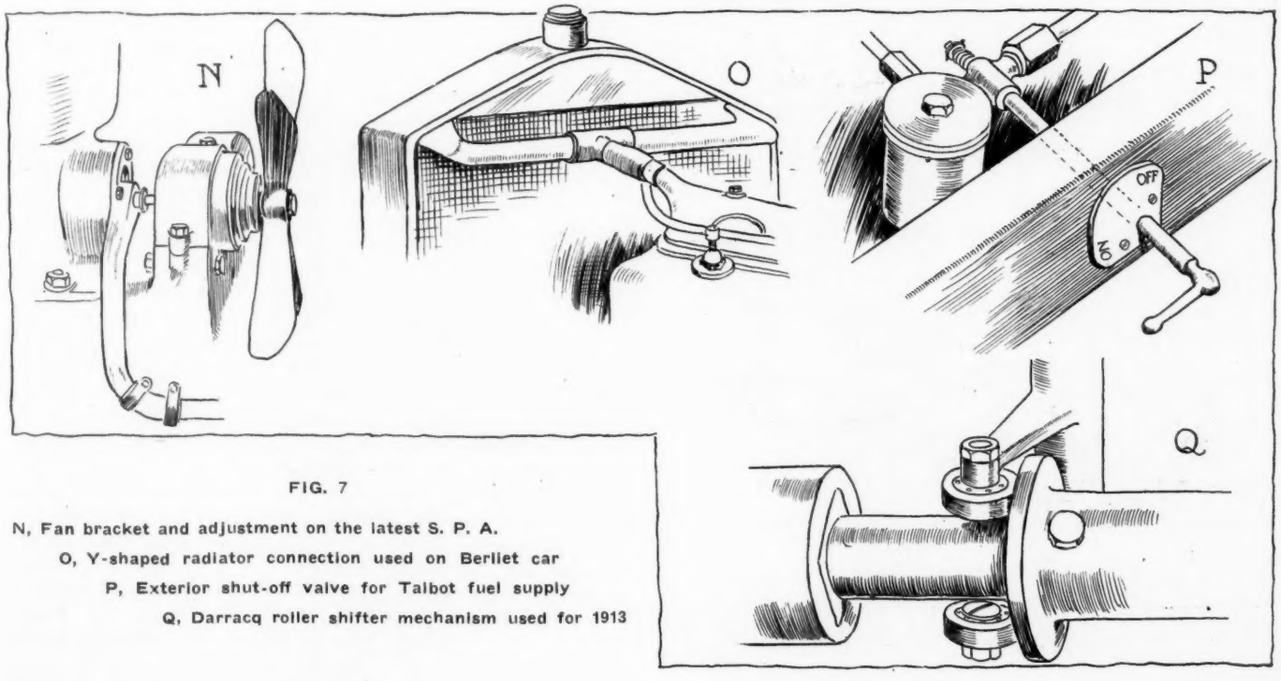


FIG. 7

N, Fan bracket and adjustment on the latest S. P. A.

O, Y-shaped radiator connection used on Berliet car

P, Exterior shut-off valve for Talbot fuel supply

Q, Darracq roller shifter mechanism used for 1913

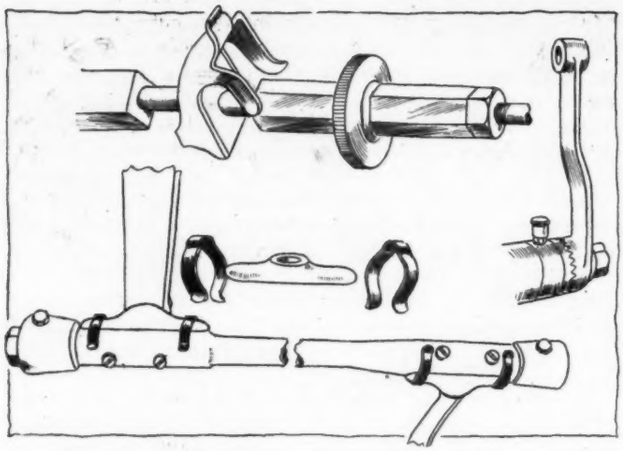


Fig. 8—Brake adjustments and lock on Crossley models

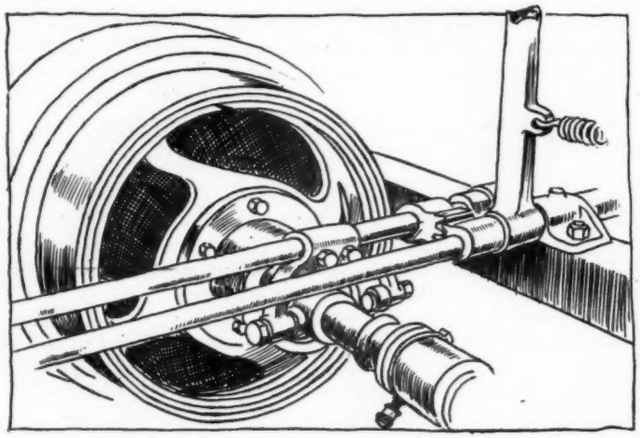


Fig. 9—Clutch and brake rod intermeshed on D. P. F.

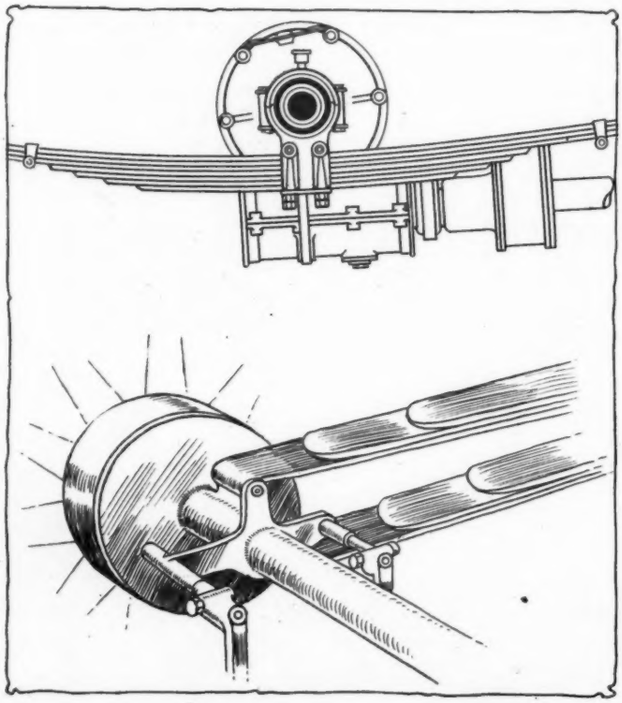


Fig. 10—Rear springs on Wolseley and Waverley cars

necessary to dismount muffler or pipes, as the valves clip on. There are six possible inlet or outlet positions, any two of gas-tight flanges. This greatly simplifies the operation of fitting the heater on the car.

The Rex induction pipe jacket has been designed to overcome the difficulty that is sometimes met in connection with types of carbureters having no warming jacket. The air that is drawn into these from some hot part of the engine sometimes becomes cooled by passing through long pipes. The Rex consists of a hollow flange-shaped fitting which is intended to be secured between the lower flange of the induction pipe and the top flange of the carbureter. Screwed into the jacket, one at each side, are two elbow pieces, and to these are coupled inlet and outlet pipes connected to the exhaust branch of the engine, so that a portion of the hot exhaust gases passes through the space within the jacket. The latter is shaped, as to its internal bore, with the serrations increasing the area of the metal, which, becoming hot soon after the engine is started, warms the passing mixture, so tending more completely to vaporize the gasoline before it reaches the engine. It should perhaps be pointed out that the freezing zone, namely, that portion of the induction pipe upon which frost appears when the mixture is unwarmed, is usually immediately above the mixing chamber of the carbureter and that it is at this point where the Rex jacket is intended to be fitted.

A survey of the exhibits gives rise to observations which may be summarized as follows: Monobloc castings are greatly on the increase. With many of these there is an inclination to cast the exhaust passages within the cylinder casting. This is specially noticeable in the Italian designs. It is very doubtful if the casting of the exhaust passage within the cylinder casting is a useful or proper construction, and it would seem far better to cast the exhaust pipe separately with four leads from the cylinders, which are generally adopted by British manufacturers. In one case with a six-cylinder engine cast in two pairs of three each, the inclusion of the exhaust passage within the main casting proved to be very faulty, and led to distortion of valves. In this case, however, thermo-syphon cooling was relied upon for the water circulation, and the majority of engines in which the exhaust manifold is not separate from the cylinders are fitted with pump circulation.

There seems to be a slight tendency towards the increase of cylinder bores, while crankshafts have undoubtedly increased in size. This leads one to the conclusion that periodic vibration is due to a large extent to over-strain on the shaft.

In very few instances were any means provided for cleaning the top of the piston and combustion head. With the majority of engines the only method of removing carbon deposit in a thorough manner is to take the cylinders off altogether, or one of the many chemical or oxygen processes.

As surmised previously, no new type of valve was exhibited. There is renewed evidence of the pains which have been taken in rendering the poppet valve engine reasonably silent. The Adler valve, B, Fig. 4, is a typical example.

The total number of cars exhibited at Olympia is 533. The countries of origin are as follows: Great Britain, 227; France, 163; Germany, 41; America, 34; Italy, 30; Belgium, 23; Switzerland, 6; Austria, 6; Holland, 3. This list includes not only vehicles exhibited by the manufacturers, but also includes those exhibited by various coach-building firms desirous of showing their work under favorable circumstances.

During the progress of the show Brooklands Track has been fully engaged, and some quite remarkable speeds have been attained. In the first place Christiaens, on a six-cylinder Excelsior car, 110 bore by 160 millimeter stroke, equalling 9,123 cubic centimeters piston displacement, beat the 50 miles world's record. His time was 29 minutes, 18.45 seconds, equalling 102.36 miles per hour. The half-mile was done at the rate of 108.3 miles per hour, and the one mile at 106.86 miles per hour. These figures, good as they are, were, however, on a recent trial badly beaten by Percy Lambert, with a four-cylinder Talbot car, 101.5

bore by 140 millimeter stroke, cubic capacity 4,531 cubic centimeters. In this instance the half mile was run at a speed of 113.28 miles per hour. The kilometer at 112.81 miles per hour, and the one mile at 111.73 miles per hour. The weight of the car with fuel, water and driver was 2,250 pounds. It was, therefore, obvious that the engine must have been developing quite 80 horsepower. The engine was in no way specially designed for racing purposes, but is one of the standard Talbot 25 horsepower motors. The carbureter was of the Stewart Talbot type, but of a larger size than that usually fitted. The tires were Palmer 820 by 120, which are now becoming quite standard tires in connection with Brookland records. The B. N. D. brand of steel piston and connecting-rods were used. The connecting-rods are of circular section, and only 1 millimeter thick. This gives one an idea of the extraordinary quality of the steel used. The Derihon shock-absorbers were fitted. These are quite a new type, and are on the principle that the suspension spring is free to move upward or downward from its normal position, and be checked only upon the return movement which follows this upward or downward displacement of the spring.

Digest of the Leading Foreign Journals

(*Continued from page* 1162.)

The approximate formula for the indicated horsepower of an engine is

$$(2) \qquad HP = \frac{S \times C}{60 \times 75} \times 2Np_i$$

in which S is the piston area in square centimeters, C the stroke in meters, N the number of revolutions, p_i the mean indicated pressure.

If f is the coefficient of the indicator spring in millimeters per kilogram of pressure, the mean indicated pressure is derived from equation (1) and has the value:

$$p_i = \frac{nk}{lf},$$

and equation (2) becomes:

$$HP = \frac{S \times C}{60 \times 75} \times 2N \times \frac{nk}{lf}.$$

Of all these values, it is noticed, the planimeter reading n is the only variable for the same engine [running at the same speed], so that, for this condition, one can write:

$$(3) \qquad HP = Kn,$$

K being a certain value with which the unit area of the planimeter can be identified by adjustment of the tracer arm.

[The author has mainly steam engines in mind, but the simplification seems applicable in practice to gasoline motors as well, if N is also singled out as a variable factor.—Ed.]

If x is the coefficient corresponding to the data of the engine and k the actual planimeter unit, one has evidently: K equals $x - k$, and, to get a simple value for K, it suffices to adjust the planimeter unit on the basis that:

$$(4) \qquad k = \frac{K}{x}$$

With such an adjustment of the planimeter, the horsepower can thus be read directly from the planimeter on the basis of equation (3) [and allowance for variations in the engine speed may be made by means of an additional factor.—Ed.]

Still more time may be gained by making use of rubricked paper, on which the diagrams are placed successively in the same position. The planimeter can then be held in the same position, and it suffices to take one reading at the beginning of the tracing of the diagrams and one at the end and to divide the difference between the two figures by the number of diagrams, thus obtaining without finicky calculations the mean indicated power which it is the object to ascertain [still on the supposition that the engine speed does not vary].—From *La Technique Moderne*, November 15.

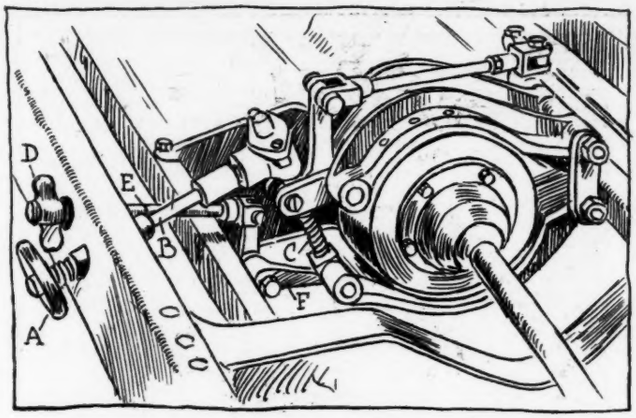


Fig. 11—Adjusting mechanism of the Standard Clutch

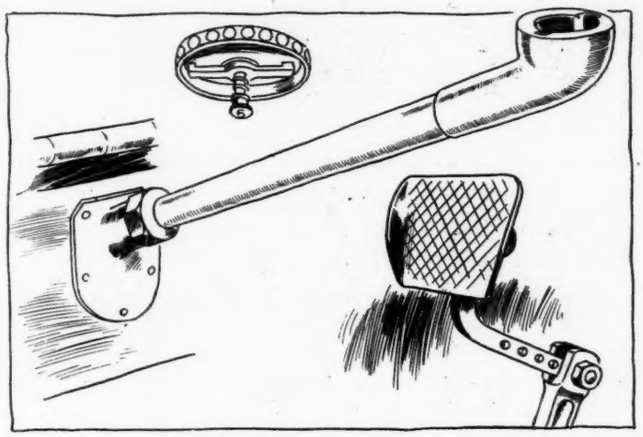


Fig. 12—Argyll gasoline filler pipe and Sunbeam pedal

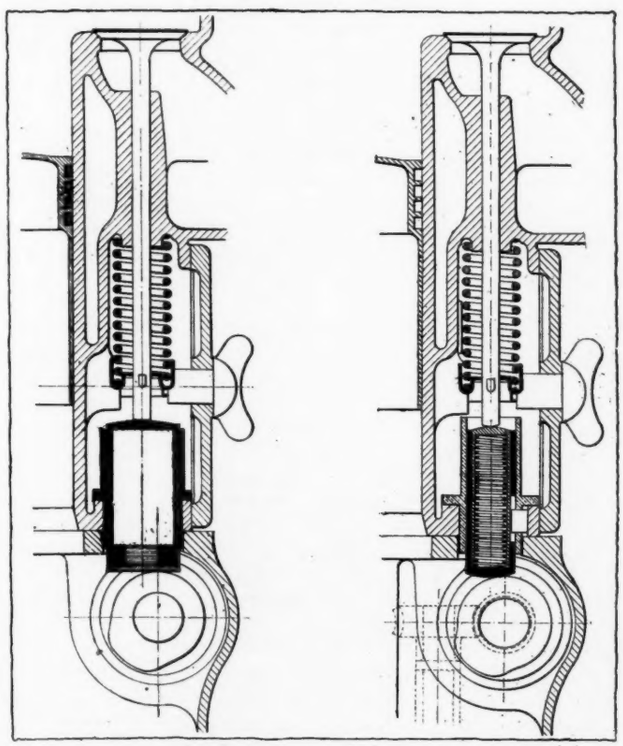
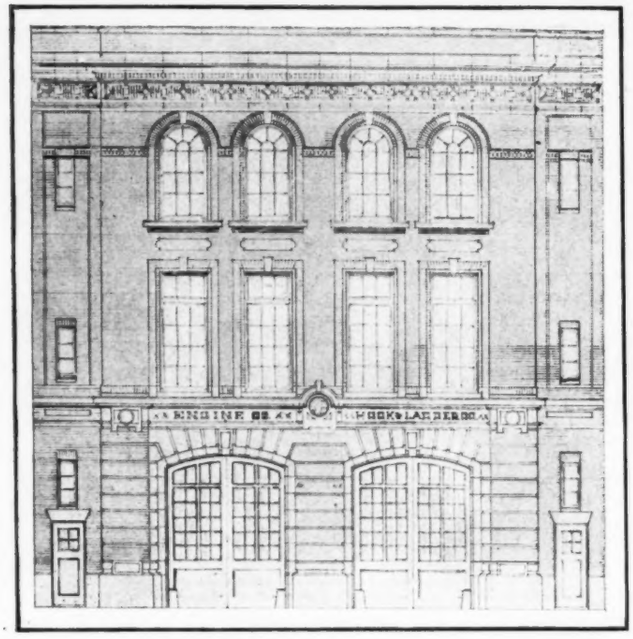


Fig. 13—Section through Germain valve, showing use of felt and springs in tappet mechanism



Front elevation of typical Brooklyn house

Gotham Is Building 45 New Fire Houses

(*Continued from page* 1153)

of the contract and the rest of the order is scheduled to come along at stated periods thereafter and the actual installation will commence shortly.

The first lot of hose wagons, consisting of five units, has been delivered and the story of the test to which they were submitted reads like a road race. The cars start from Broadway and Fifty-seventh street, work north through traffic to Van Cortland Park, swing east to the Concourse and thence south on the Concourse through the heart of the Bronx and back to the point of starting.

In order to cover this course of 20 miles in an hour, it is necessary to touch a speed of 35 miles an hour once in a while. On the Concourse the maximum speed test is applied and the car must maintain a speed of 30 miles an hour over at least 1 mile. Such speed on solid tires is quite a strain on cars and men.

The motor is of four cylinders 4 1-2 by 5 1-2 and rated at 32 horsepower. The fire-fighting equipment is similar to that in use in the department. There is no material variation from the prevailing type of bodies.

These wagons will be used where quick action is the prime essential. It has been found that fire losses mount up geometrically in the ratio of delay in extinguishing the blaze. Mrs. O'Leary's cow kicked over a lantern which started the conflagration that destroyed Chicago. If the late Mrs. O'Leary had summoned the fire department and if the fire department had rushed one of the new hose wagons to the historic barn with a charge of chemical extinguisher, the history of the republic might have been changed. Measured in minutes saved, the efficiency of a fire department equipped with swift wagons fitted for fighting and conquering small blazes is vastly higher than where time must be lost in getting the heavier apparatus into action. Minutes literally mean millions in fire department terminology.

The next lot of apparatus under contract consists of twenty-eight steam fire engines drawn by tractors. These are to be furnished by the American-La France company. In bidding for the job this company had an advantage in that it specializes in fire engines. The tractors are to be of the two-wheel type driven by four-cylinder, four-cycle, water-cooled motors capable of developing a speed of 25 miles an hour and a sustained speed of 20 miles an hour for at least an hour through city traffic. The recommended standards of the S. A. E. are specified for the guidance of bidders. One feature of this lot of apparatus is that the specifications require that the tractor shall be easily detachable from the fire engine so that in case of failure of the propelling power or for other reasons horses may be substituted with minimum loss of time in emergencies.

An alternative tractor, the generative power for which shall be furnished by a 40-horsepower gasoline engine producing electric current for final drive, which must conform to the speed tests required of the foregoing type of tractor, is allowed under the specifications. The contract was let August 15 and the first block of five is due in 120 days from that date. The remainder must be delivered within 120 days thereafter.

The contractor is obliged to guarantee the machine for 3 years after delivery against the results of poor material or poor workmanship. The contractor has given a bond to the city amounting to half of the contract price conditioned upon the terms of the guarantee.

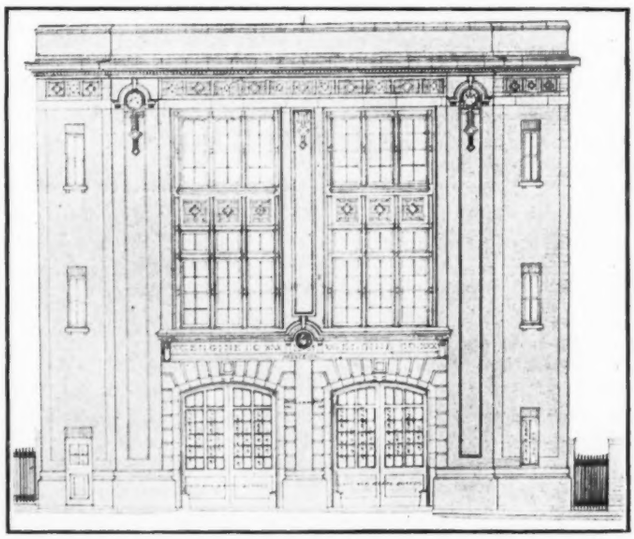
The contract just let for the tractor trucks provides for motors of the same general type as those called for in the case of the steam fire engines. The specifications call for automobiles standardized under the S. A. E. recommendations. The same option is given under them to supply gasoline generators with final drive by electricity. The tractors must be able to cover 20 miles within an hour through city traffic.

The trucks must all be delivered within 300 days of the execution of the contract, but some of them must be ready in 180 days.

Eighty-five Pieces in Apparatus Order

The whole order for new equipment amounts to eighty-five pieces and is not sufficient to supply the needs of the new houses. It will be necessary to purchase and install somewhere in the neighborhood of $500,000 worth more apparatus before the full capacity of the houses is filled, but in the meantime there will be enough of the new machines in daily service to test out the main idea underlying motorization.

This order is not in present contemplation, but will probably be taken up during 1913. If the new equipment answers requirements the displacement of horses will probably commence on a permanent basis not later than the beginning of 1914. It will not be on a wholesale scale such as might be indicated by the present additions, but will be accomplished gradually as the veteran horse-drawn equipment shows signs of faltering.



Bronx double house, 8 feet narrower than old type

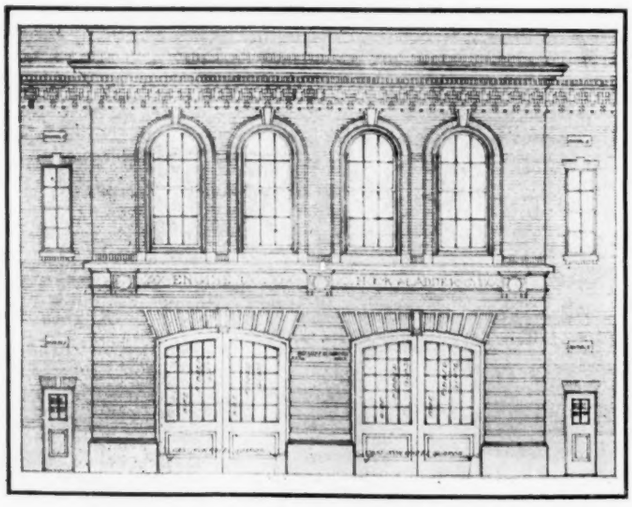
The shadow of doubt as to the complete success of the present plans for motorization is founded upon some of the experiences of the past when makeshift mechanism failed to justify preconceived hopes. On the face of the specifications and contracts awarded for the new equipment this doubt appears to be unjustifiable, particularly in view of the fact that it has been definitely proven that the horse is extravagantly inefficient in long distance work.

The chief faults that have been found with relation to the automobile equipment that has been installed by the department, are lack of speed in some of the pieces; and the tendency to break down either through accident or otherwise. Part of the responsibility must be laid at the doors of the apparatus and at least a large part to the inexperience of the men who handled it.

In order to correct the first fault, the department has striven to secure better settled apparatus and to do away with the latter objection, it has installed a school of instruction that is designed to convert a plain fireman into a competent chauffeur and mechanic. This school turns out classes of graduates in 90 days and has been extraordinarily active in preparing for the reception and installation of the new machinery.

The original plan of the department included provision for a big municipal automobile factory. It was intended to erect a repair plant at a cost of $1,000,000 and to provide for manufacturing at subsidiary plants. The whole cost of operation was estimated at $3,000,000. But the authorities who have the veto power in such matters refused to sanction the appropriation. In case the plan had been adopted the department would have been in position to manufacture its own apparatus but it was shown that the cost would have been too high and in any new project of such scope the chance for failure must be reckoned.

The orders for fire apparatus given by the department are by far the largest group of orders ever placed for automobile fire apparatus.

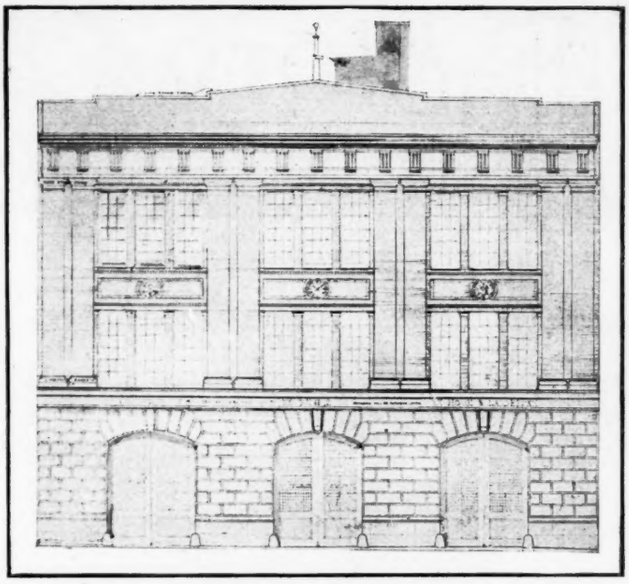


Big double house located in populous part of Queens

Harking Back a Decade

From *The Automobile and Motor Review*, December 6, 1902:

WITH a field of twenty starters and a number of outside cars, the Automobile Club of New Jersey held a successful hill-climb on Eagle Rock Hill on Thanksgiving Day. The day was gloomy and rain fell before and during the contest, turning the hill into a sheet of slippery mud. The course is 9 furlongs and the rise is 360 feet, maximum grade 17 per cent. W. J. Stewart in a Locomobile made the fastest time, covering the course in 2:58¾. The cars were classified by motive power and weight. The average time made was 4:43. Secretary S. M. Butler of the Automobile Club of America with a Mors timing instrument was in charge of the recording of the trials.



Triple house which will be equipped with six automobiles

Pronunciation of the names of French cars is still one of the puzzling things to American automobilists. De Dion-Bouton is about the worst thing for them to handle, but C. G. V. and Gillet-Forest are close competitors.

Col. John Jacob Astor has offered to subscribe $10,000 to aid in the construction of the national highway, on condition that the road run on the east bank of the Hudson, instead of the west bank. The suggestion has been made that the national government might be persuaded to appropriate $2,000,000 to construct a series of 40-mile stretches in each of the five districts comprised in the proposed road from New York to San Francisco

Mrs. J. B. Gibson of New York has just completed a 4000-mile tour through Europe in her new Panhard. She declares that the German officials were particularly pleasant in administering the laws and that she was not obliged to register in crossing the border or to carry numbers or initials to identify the car.

King Leopold of Belgium has commenced work on the preliminaries of a project to connect Ostend with Paris by a fine boulevard. Within the boundaries of Belgium the chief work required will be the substitution of macadam for the granite blocks that now extend from Ostend to Dunkergue. It is intended to have the road finished by July, 1903.

Kenneth A. Skinner of Boston recently made the round trip from that city to New York and return, 488 miles, in 35 hours elapsed time. He used an 8-horsepower De Dion, 1902 model.

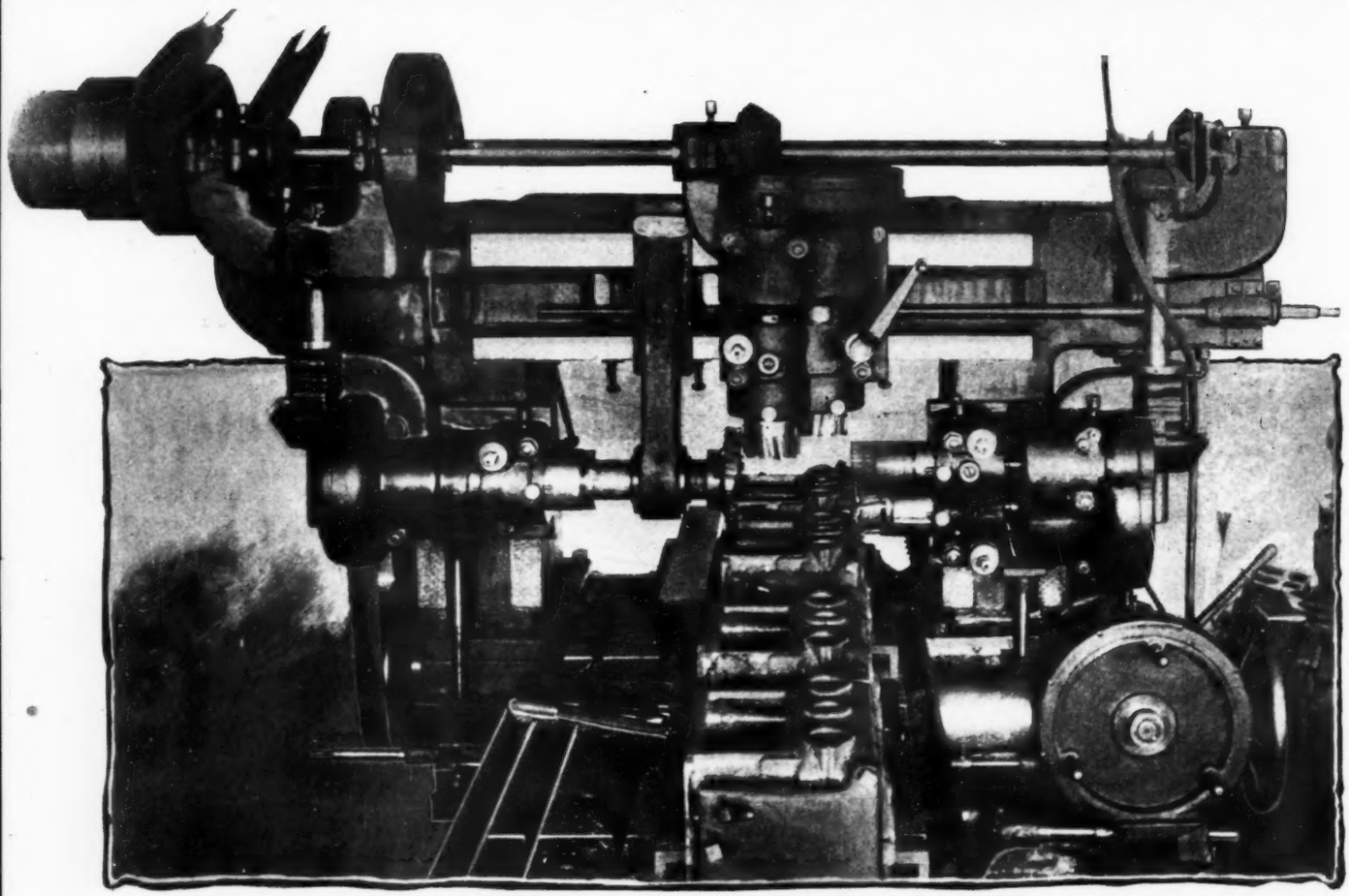
The American idea of quantity production has been adopted by some of the French automobile factories. Jigs and templets have displaced manual skill at the Darracq and De Dion factories and a production of 2000 of the latter vehicles has been announced for next year.

F. T. F. Lovejoy, secretary of the Carnegie Steel Company at Pittsburgh, has let plans for the building of a private automobile stable or garage to cost $175,000. Mr. Lovejoy has eleven cars ranging all the way from a 40-horsepower racer to a small car for boulevard work.

Licensing of all drivers of motor vehicles is being discussed in New York City and an open hearing on the subject will be held shortly. The national organizations do not object to licensing the drivers, but they protest that the legislation should be by the state and not by the city.

A Winton car has been entered for the next Gordon Bennett cup race which will be run in Ireland or France next year.

Factory Miscellany



Cylinder milling machine in use in the factory of the Velie Motor Vehicle Company, Moline, Ill.

THE above machine mills eight Velie cylinders at a time. This machine saves time and pays for itself in a short time—besides, and what is more important, it does the work well. In a factory where the uniformity of product and interchangeability is made an aim, a machine that will do the work rapidly is of special interest. This particular milling plant has a bed which supports four blocks of cylinders at a time. It has five simultaneously operating cutters which are shown in position. One man handles the machine. He can set up a job in 5 minutes and in 20 minutes more he will have milled a block of cylinders. This gives the Velie plant an output of 30 blocks of cylinders per day or enough for fifteen motors. Since the total production of the company is about fifteen motors a day this machine just takes chare of the output. The way the machine saves money is this: The Velie concern used to mill one block at a time. It took a longer time for the milling job and about the same time for setting up. In other words, 40 minutes was lost on each cylinder, 1,200 minutes per day's output—20 hours! This is equal to the work of two machines each working 10 hours a day. It is readily realized how valuable such a machine is as a time-saver.

NEW Timken-Detroit Building—Work on the new three-story and basement addition to the Timken-Detroit Axle plant, Detroit, Mich., is being pushed rapidly. The brick and steel structure is 60 feet wide and 275 feet long. On the first three floors the materials used in the manufacture of axles will be stored. On the top floor the general offices of the company will be located. This is the second big addition which has been erected within the year. The two buildings will increase manufacturing space about 33 1-3 per cent. New machinery worth $100,000 will be installed and 300 more men employed. The accompanying illustration shows the factory.

Chalmers Adds—The Chalmers Motor Car Company, Detroit, Mich., has begun the construction of a one-story brick addition to its factory.

Plant Has Fire—Fire which started with a gasoline explosion did $20,000 damage in the Nyberg Automobile plant, Chicago, Ill. No one was injured.

Anderson Resigns—Ross Anderson, for the past 3 years factory superintendent of the American Locomotive Company, Providence, R. I., has resigned his position to take effect January 1.

Brown Company's Plant—The John W. Brown Manufacturing Company, Columbus, O., will soon award the contract for the construction of a large addition to its plant. The company manufactures automobile lamps.

Moon Installs Machinery—The Moon Motor Car Company, St. Louis, Mo., recently installed a considerable amount of new machinery in its rear axle department. That department is now equipped to turn out a new rear axle every 20 minutes.

Lamp Company Builds—The Guide Motor Lamp Company has had plans prepared for the general contract for a new factory building to be erected in Cleveland, O. Plans call for a two-story and basement brick, steel and reinforced concrete building about 60 feet by 130 feet in dimensions, with cement and oak floors, electric lights, steam heat and a composition roof.

Kelsey Plant Damaged—The plant of the Kelsey Wheel Company, Detroit, Mich., was damaged by fire last month to the extent of $5,000. The origin of the blaze is unknown.

Michigan Steel's Addition—The Michigan Steel Castings Company, Detroit, Mich., has purchased a piece of property adjoining its present plant at Atwater and Guoin streets for an addition to its factory. The plot measures 92 feet by 190 feet.

Work on Dunkirk Factory—Work was begun on the construction of the plant at Dunkirk, N. Y., for the Niagara Gasoline Motor Company, which concern recently moved from Buffalo to that town. The building will be erected on Brigham road near the Lake Shore tracks.

Alco Factory in Detroit—It is reported that the American Locomobile Company is seriously considering the movement of the company's automobile factory from Providence, R. I., at Detroit, Mich., to manufacture the Alco car and that the committee is negotiating with the creditor's committee of the Grabowsky Power Wagon Company.

Racine's Radiator Company—The Perfects Radiator Company, of Chicago, Ill., has moved to Racine, Wis., and established a workshop on Fifteenth street and the Northwestern tracks. The production consists of motor car radiators, pumps, and other cooling devices. Twenty hands are employed and the force will be increased as needed.

Stove Works for Auto Plant—The Palmer-Moore Company, Syracuse, N. Y., has bought the plant of the Syracuse Stove Works in North Geddes street and will use the buildings to manufacture motor trucks. T. W. Meachem recently bid in the stove works buildings for $20,000 at a bankrupt sale. It is understood the creditors sold to the Palmer-Moore company at an advanced price. The property has been appraised at $75,000.

Lambert's Three Factories—In addition to the factories of the Waterman Company and the Monarch Electric Company, St. Lambert, Can., is to have a third factory which will engage in the manufacture of auto trucks. Mr. George Charrier, representing the Gearless Autotruck Company, yesterday purchased lots comprising about 10,500 square feet. On this it is the intention to erect a three-story steel and concrete building to be exclusively devoted to the manufacture of trucks for various purposes built according to an invention of Mr. Charrier.

Negotiating for Site—Negotiations are in progress for a site for a large plant to manufacture electric automobile tranmissions in Cleveland, O. It is stated that the new transmission, which can be attached to any gasoline motor-driven automobile, eliminates the present gear-driven transmission clutch, flywheel, heavy self-starter and the generator for the charging of batteries now part of automobile equipment. It has not yet been decided whether the new company will manufacture complete cars with the new electric transmission, or whether the gasoline and new electric transmission only will be manufactured and sold to makers of automobiles.

Shows, Conventions, Etc.

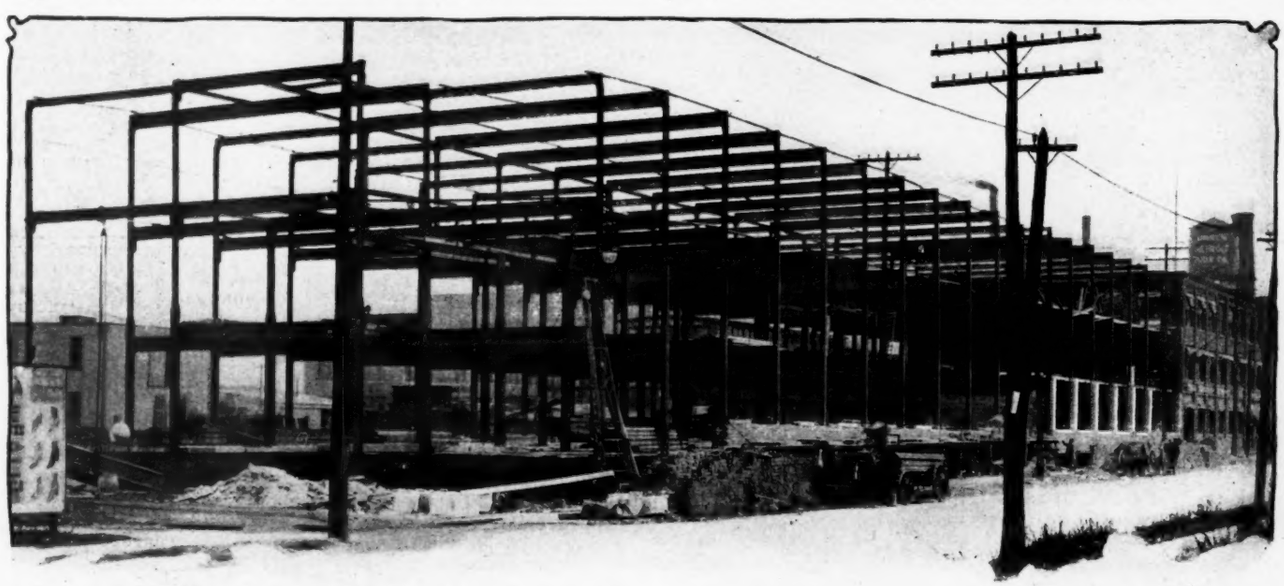
Jan. 2-10.....New York City, Importers' Salon, Hotel Astor, Importers' Automobile Alliance.
Jan. 4-11.....Cleveland, O., Annual Automobile Show.
Jan. 4-11.....Montreal, Que., Montreal Motor Show, Drill Hall and 65th Regiment Armory.
Jan. 11-18.....Milwaukee, Wis., Annual Show, Auditorium, Milwaukee Automobile Dealers' Association.
Jan. 11-25.....New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25.....Philadelphia, Pa., Annual Automobile Show.
Jan. 21-26.....Toledo, O., Annual Show, Exposition Building, Toledo Automobile Shows Company.
Jan. 25-Feb. 1.....Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1.....Buffalo, N. Y., Annual Automobile Show.
Jan. 27-Feb. 1.....Detroit, Mich., Annual Automobile Show.
Jan. 27-Feb. 1.....Ottawa, Ont., Ottawa Motor Show, Howick Hall, Louis Blumenstein.
Jan. 27-Feb. 1.....Scranton, Pa., Annual Automobile Show, Hugh B. Andrews.
Feb. 1-8.....Chicago, Ill., Annual Automobile Show.
Feb. 10-15.....Chicago, Ill., Truck Show.
Feb. 10-15.....Minneapolis, Minn., Annual Automobile Show.
Feb. 12-15.....Geneva, N. Y., Automobile Show, Armory, Louis Blumenstein.
Feb. 15-22.....Newark, N. J., Annual Automobile Show, First Regiment Armory, New Jersey Automobile Exhibition Company.
Feb. 17-22.....Kansas City, Kan., Annual Automobile Show.
Feb. 18-22.....Baltimore, Md., Annual Show, B. A. D. A.
Feb. 20-22.....Canandaigua, N. Y., Automobile Show, Louis Blumenstein.
Feb. 24-Mar. 1.....Cincinnati, O., Annual Show, Music Hall, Cincinnati Automobile Dealers' Association.
Feb. 24-Mar. 1.....Omaha, Neb., Annual Automobile Show.
Feb. 24-Mar. 1.....Paterson, N. J., Annual Show, Paterson Automobile Trade Association.
Feb. 26-Mar. 1.....Glen Falls, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 3-8.....Pittsburgh, Pa., Annual Automobile Show.
March 8-15.....Boston, Mass., Annual Automobile Show.
March 12-15.....Ogdensburg, N. Y., Automobile Show, Louis Blumenstein, Manager.
March 18.....Syracuse, N. Y., Annual Show, Syracuse A. A.
March 19-26.....Boston, Mass., Annual Truck Show.
March 20-24.....New Orleans, La., Annual Show, N. O. A. D. A.
March 24-29.....Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

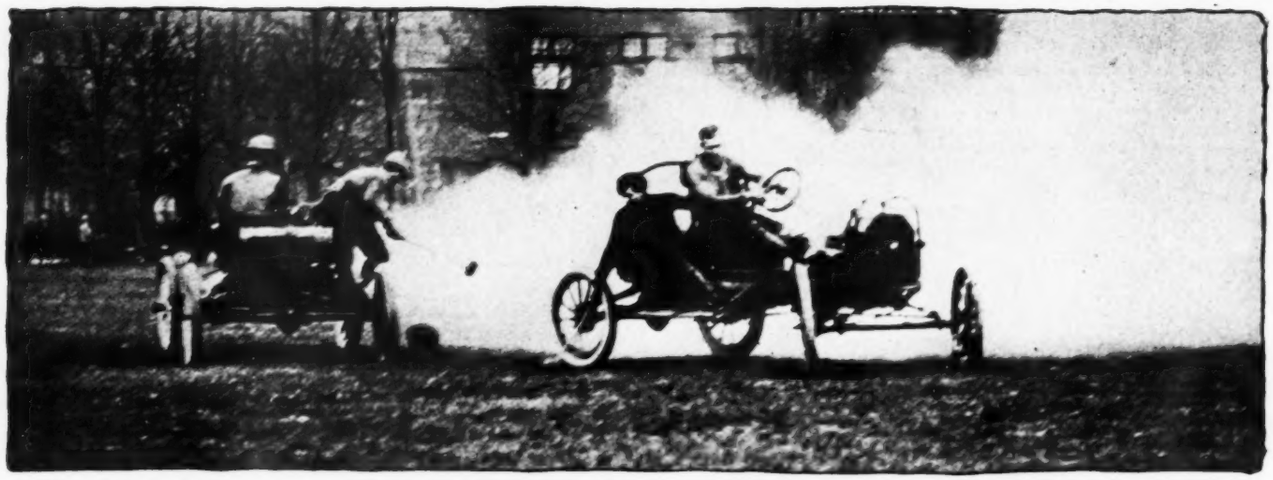
May 30.....Indianapolis, Ind., 500-Mile Race, Speedway.

Foreign

Dec. 7-22.....Paris, France, Paris Automobile Show, Grand Palais.
Jan. 11-22.....Brussels, Belgium, Annual Belgian Automobile Show, Centenary Palace.
March .....France, Sealed Bonnet 3000-Mile Run.
April .....Barcelona, Spain, International Exhibition.



Three-story and basement addition to the Timken-Detroit axle plant now in process of construction in Detroit



Trying out the new game of automobile polo in Detroit, Mich. The circular bridge steel support on the cars is for the protection of the drivers in the event of the machines turning turtle as they frequently do in this pastime

AUTOMOBILE Polo New Sport—Upsets, bursted tires, buckled wheels, marked the Detroit, Mich., trial game of polo with automobiles. This game has proved most exciting. Two Ford cars were used. These were stripped for action until they consisted of but the chassis, with but one seat, one running board and the engine. When the cars have lined up at the goal posts with the ball directly in the center of the field, the official in charge fires a pistol and they rush at the ball in the center. From then on the elusive ball is sought, incurring upsets and all manners of accidents. The accompanying photograph shows the cars in action.

Washington Goodrich Moves—The Diamond and Goodrich tire depots, Washington, D. C., have been removed from 1319 Fourteenth street to larger quarters at 1502 Fourteenth street.

Opens Branch Office—F. M. Russell, manager of the Puyallup Garage and Pierce County agent for the Essenkay tire filler, has opened a branch office in Tacoma, Wash., at 902 Tacoma avenue.

Want Show Representation—Sixty per cent. of the Seattle, Wash., dealers have signified their intention of seeking representation at the automobile show to be held in the Armory, December 16 to 21.

Linteau Promoted—J. O. Linteau, of P. T. Legare, of Quebec City, Can., has been promoted to the managership of the Montreal branch of Legare-Gadbois Automobile Company, Ltd., succeeding M. J. Gadbois.

Philadelphia Company Moves—The American Automobile Company, Philadelphia, Pa., has removed from the southwest corner of Broad and Callowhill streets to its new sales and service building at 2116 Market street.

Syracuse Has New Garage—The Jefferson Garage Company, Syracuse, N. Y., central New York distributors for National and Hupmobile pleasure cars and the International Harvester truck, has opened a new fireproof garage.

Mineter with Rayfield—N. H. Mineter is now associated with Findeisen & Kropf Manufacturing Company, of Chicago, Ill., as factory sales manager. He will in future represent the Rayfield carbureter throughout the country.

Fire Truck for Ottawa—Ottawa, O., has just received a $5,500 automobile fire truck, which has already been demonstrated. It is 70 horsepower, and capable of making 60 miles an hour. It will carry 1,000 feet of hose and a dozen men.

Troutman Resigns—J. F. Troutman, manager of the sundry department of the Franklin Automobile Company, Syracuse, N. Y., has severed his connections with that company to take up work with the H. A. Smith Machinery Company of that city.

E. L. Retting as Wholesale Agent—A direct factory branch of the Federal Rubber Company has been opened at 361-363 Golden Gate avenue, San Francisco. E. L. Retting will act as wholesale agent and Mohring Bros. will act as retail distributors in San Francisco.

Meet Highway Commission—More than 100 members of the East St. Louis Commercial Club, St. Louis, Mo., motored to Collinsville, Ill., recently to meet the Illinois State Commission which is touring the several suggested routes for the new State Highway.

Lu Lu Club's Election—The following nominations for officers and board of governors of the Lu Lu Temple Automobile Club, Philadelphia, Pa., have been made: president, Joseph Way; vice-president, C. L. Martin; secretary, H. S. Evans; treasurer, W. C. Buck.

Retail Department Transferred—The retail selling department of the Studebaker Corporation, Philadelphia, Pa., has been transferred to the Wallace Automobile Company, which has secured new and enlarged quarters at the southwest corner of Broad and Callowhill streets.

Building Moline Garage—Fred R. Young is building a new garage on Sixth avenue, Moline, Ill., to be completed January 15. The building will be of brick, 45 feet by 150 feet in dimensions, two stories in height, to cost $20,000. The building will be known as the Plow City Garage.

Tractors for Farm Work—J. J. Dauche, a Sandusky, O., manufacturer, has organized a company to manufacture a gasoline tractor, especially adapted to farm work. It is the aim of the promoters of the concern to develop a tractor which will take the place of horses for all farm work.

Commercial Company's New Quarters—The Commercial Automobile & Supply Company, Washington, D. C., Studebaker agents, have leased the first floor and basement of the Pope building, formerly occupied by the Pope Automobile Company, and after extensive alterations will take possession about February 1, 1913.

New Orleans Show in March—This year's New Orleans La., 5-day automobile show will be held March 20-24. It has been decided by the Dealers' Association after the minority had worked hard for an earlier show. It was decided also to hold two shows each year beginning with 1913. The second show next year will be held in November and will be made an annual feature.

New Agencies Established During the Week

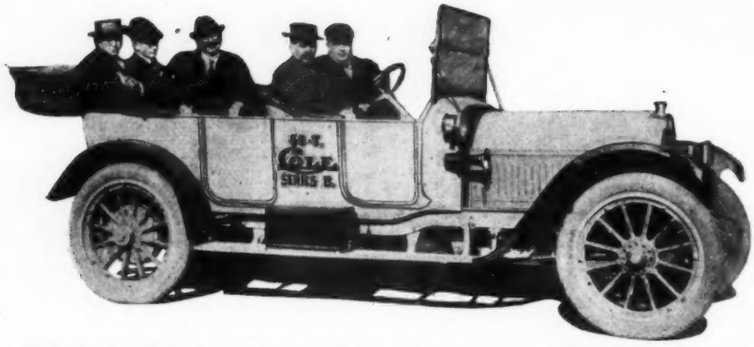
PLEASURE CARS

Place	Car	Agent
Akron, Colo.	R-C-H	G. MacDonald
Albuquerque, N. M.	Haynes	C. T. Williams
Aledo, Ill.	Moon	E. B. Miller
Alliance, Neb.	Mason	N. C. Pederson
Amityville, L. I.	Franklin	A. R. Quick
Amarillo, Tex.	R-C-H	Lon Sellars
Baltimore, Md.	Little	Auto Outing Co.
Berlin, N. H.	R-C-H	W. G. Dupont
Brighton, Ill.	Empire	W. G. Hunt
Broken Bow, Neb.	Cartercar	Bromen Bow Auto Co.
Cambridge, O.	R-C-H	J. B. Siegfried
Canton, O	Moon	Auto Service Co.
Canton, O	R-C-H	A. H. Wilson Motor Car Co.
Carmi, Ill.	Empire	J. F. Orr
Carlisle, Pa.	Empire	Cumberland Valley Gar.
Central City, Neb.	Michigan	Linderman & Blake
Charleston, Mo.	Moon	Luke Howlett
Cincinnati, O.	Empire	Commercial Motor Sales Co.
Dallas, Tex.	R-C-H	Davis & Turney Auto Co.
Danube, Minn.	R-C-H	F. Schroeder
Des Moines, Ia.	Empire	rtercar Iowa Co.
Des Moines, Ia.	Haynes	Lagerquist Carriage & Auto Co.
Delhi, Minn.	R-C-H	Kunde A. Knudson
Edgeley, N. D.	R-C-H	A. M. Hodge
Elliott, Ia.	Michigan	M. Lembke
El Paso, Tex.	Haynes	W. F. Payne
Englewood, N. J.	Haynes	Stillman & Hoag
Evanston, Ill.	R-C-H	Fancher Bros.
Fall River, Mass.	Franklin	Eckberg-Place Gar. Co.
Freeport, Ill.	Haynes	Seth Scott
Fullerton, Neb.	Cartercar	T. M. Sheath
Galion, O.	Empire	Galion Motor Car Co.
Garske, N. D.	R-C-H	R. J. Orchard
Gaylord, Minn.	R-C-H	N. C. Doering
Geneva, Neb.	Nyberg	W. H. Menking
Greentown, Ind.	Empire	H. F. Wagner
Greenville, S. C.	Empire	Ellis Car Co.
Hackensack, N. J.	R-C-H	Beyer & Feakes
Hannibal, Mo.	Moon	Long Mfg. Co.
Hartington, Neb.	Studebaker	Nelson & Roskopf
Hastings, Neb.	Cartercar	C. W. Jacobs
Hicksville, N. Y.	R-C-H	Karlson's Garage
Hillsboro, Tex.	R-C-H	Walter-Hafner Jewelry Co.
Houston, Tex.	Haynes	Gulf Motor Car Co.
Ipava, Ill.	R-C-H	E. J. Weese
Ipswich, Mass.	R-C-H	E. C. Currier
Jackson, Miss.	Haynes	Floyd Willis
Kansas City, Mo.	Empire	England Bros. Motor Co.
La Carne, O.	Empire	W. S. Woodring
Lancaster, Pa.	Haynes	Butzer Bros.
Lincoln, Neb.	Studebaker	Wertz Auto Co.
Los Angeles, Cal.	Empire	Greer-Robbins Co.
Loveland, Colo.	R-C-H	Ray Danner
Madisonville, O.	Franklin	W. G. Blaney
Malvern, Ia.	Nyberg	I. G. Bliss
Mancos, Colo.	R-C-H	G. D. Woods
Mascoutah, Ill.	Empire	Schoepp & Karch
Mason City, Ia.	Haynes	M. J. Lyons
New Haven, Conn.	Moon	I. J. Laverty
New Haven, Conn.	Stutz	Stutz Auto Co.
New London, Conn.	Stutz	Stutz Auto Co.
New Orleans, La.	Haynes	Demack Motor C. Co.
Odell, Tex.	R-C-H	B. D. Smith
Ogallala, Neb.	Studebaker	Jay Ellingsworth
Olean, N. Y.	R-C-H	G. R. Daniels
Olsen, N. D.	R-C-H	Martin Rimestad
Omaha, Neb.	Haynes	Drummond Motor Co.
Orange City, Ia.	Moon	Aerotte Van Der Wilt
Orleans, Neb.	Cartercar	Lideen Hardware Co.
Pender, Neb.	Empire	Silas Lieb
Petersburg, Va.	Moon	Wm. P. Atkinson
Pompton Plains, N. J.	Empire	W. H. May
Portland, Me.	Flanders	Speare Auto Co.
Quincy, O.	Empire	Haines Bros.
Richmond, Va.	Haynes	Alsop Motor Co.
Roanoke, Va.	Haynes	J. E. Hunter
Rochester, N. H.	R-C-H	W. H. Carll & Sons
Rosenberg, Tex.	Moon	Rosenberg Auto Co.
Roswell, N. M.	Haynes	C. T. Williams
Schaller, Ia.	Moon	E. F. F. Hasseler
Schenectady, N. Y.	R-C-H	W. D. Havens
Schleswig, Ia.	Michigan	G. T. Hollander
Scribner, Neb.	Nyberg	W. A. Kurz
Sheboygan, Wis.	Cadillac	Clarence Garton
Sheboygan, Wis.	Kissel Kar	Sheboygan Auto & Supply Co.
Superior, Neb.	Rambler	Jack Galbreth
St. Louis, Mo.	Cutting	Rindell Auto. & Repair Co.
St. Louis, Mo.	Empire	Johnson Auto. Co.
Toledo, O.	Empire	Crist Motor Sales Co.
Toronto, Can.	Moon	Auto. Sales Co., Ltd.
Taylor, Tex.	Moon	Prewitt Auto Co.
Texarkana, Tex-Ark.	Moon	Paul Jones
Terre Haute, Ind.	R-C-H	Terre Haute Machine Works
Vermillion, S. D.	Haynes	M. L. Thompson
Wall Lake, Ia.	Moon	Hopkins & Harrig
Waterloo, Ia.	Haynes	J. C. Hileman & Son
Waterville, Me.	R-C-H	Elm City Publishing Co.
Winfield, Ia.	Moon	Nesbitt Auto & Supply Co.
Wooster, O.	R-C-H	J. N. Ginter
Yankton, S. D.	Moon	F. J. Nyberg
Whitehall, Md.	Ford	Anderson & Wiley

COMMERCIAL VEHICLES

Allentown, Pa.	Stewart	Allen Motor Co.
Baltimore, Md.	Stewart	R. Stuart Beaver
Cleveland, O.	Stewart	H. E. Ricker & Co.
Columbus, O.	Federal	Coates Motor Co.
Columbus, O.	Gramm	O. G. Roberts & Co.
Birmingham, Ala.	Federal	Birmingham Motor Co.
Buffalo, N. Y.	Stewart	Reinold Bros.
Edmonton, Alb.	Stewart	Northrup Motor Service Co.
Houston, Tex.	Stewart	Young & Dwire
Kansas City, Mo.	Gram	Bond Motor Co.
Los Angeles, Cal.	Stewart	Albert Biner
Nashville, Tenn.	Stewart	Martin & Crocker
Philadelphia, Pa.	Stewart	Gomery-Schwartz Motor Car Co.
Portland, Ore.	Stewart	Coast Commercial Car Co.
Rochester, N. Y.	Stewart	Mandery Motor Car Co.
Salem, Mass.	Stewart	North Shore Motors & Service Co.
San Francisco, Cal.	Kissel Kar	J. W. Leavitt & Co.
San Francisco, Cal.	Overland	J. W. Leavitt & Co.
Savannah, Ga.	Stewart	Savannah Motor Car Co.
St. Louis, Mo.	Stewart	Federal Truck Co. of St. Louis
St. Paul, Minn.	Stewart	Borg & Wharry Motor Co.
Toledo, O.	Gramm	Landman & Griffith
Utica, N. Y.	Stewart	Crim-Bronner Auto Co.
Wilkes-Barre, Pa.	Stewart	Koons & Hallier

The Day School of the Boston Y. M. C. A. on a recent tour of inspection through the service department of the Packard Motor Car Company in that city



President J. J. Cole, of the Cole Motor Car Company, Indianapolis, Ind., at the wheel of the new 6-60 model

Fresno has 2,000 Cars—Fresno, Cal., has over 2,800 registered cars and the county has over 4,000.

Membership Campaign Successful—The membership campaign waged by the Vancouver, B. C., Automobile club is meeting with success.

Illinois Registration Statistics—Automobile license, issued in the state of Illinois from January 1 to September 30, inclusive, numbered 65,299.

Jacobson in Metal Field—I. M. Jacobson & Sons, Detroit, Mich., are operating a company for the sale of strictly pure metals of every description.

New York Club's Membership—The New York Motor Club, New York City, now has nearly 140 members and expects to have 200 by the time the show opens.

Wagner with Garford—H. A. Wagner has left the Peckham Motor Car Company, Dayton, O., and is now connected with the sales department of the Garford Company, Elyria, O.

Italian Imports in 1911—During the 1911 season the imports of Italian automobiles to the United States was valued at $186,746, as against $295,013 in 1910 and $674,666 in 1909.

Tri-City Traffic Resolution—Davenport, Rock Island and Moline automobile men at a meeting at Davenport, Ia., last week, unanimously adopted a resolution favoring uniform traffic ordinances for the tri-cities.

New Headquarters—Frank G. Miner, Southern California distributor of Kelly trucks has opened headquarters at South Grand avenue, Los Angeles, where the Southern Pacific coast distribution will be centralized.

Wells Changes—J. R. Wells, formerly sales manager for Legare-Gadbois Automobile, Ltd., Montreal, Que., has resigned his position to take up similar duties with the Motor Import Company, of Canada, Ltd., this city.

W. E. Bayless Appointed—W. E. Bayless, formerly Seattle manager for Fisk Rubber Company, has been appointed to succeed the late Tom Rawlins, who died several weeks ago, as manager of the San Francisco branch.

Use American Tires—Taxicabs in Norway, Sweden, Denmark and Finland will run on American tires. A contract for 750 sets of tires for use on taxis in these countries has just been closed between a Stockholm and American firm.

J. R. Thomas Appointed—J. R. Thomas, who has been manager of the Washington, D. C., branch of the United States Motor Company since March, 1910, has been made manager of the branch at Philadelphia, Pa. He has been connected with motor industries in Washington since 1905.

Anderson Resigns—D. G. Anderson, who has been cost accountant of the Russell Motor Car Company, Ltd., Toronto, Can., has resigned his position with that company to take effect at once. Mr. Anderson has been appointed the purchasing agent for the Tudhope Motor Car Company, Ltd., of Orillia, Can.

Syracuse Show in March—The Syracuse Automobile Association, Syracuse, N. Y., announces that the next show will begin Tuesday evening, March 18, and the main show will be held at the Armory. If the number of exhibitors warrants it the Alhambra will also be engaged and two shows held, as last year.

Henderson Starts Western Tour—O. B. Henderson, sales manager of the Baker Motor Vehicle Company, Cleveland, O., started the latter part of November for his annual tour through the western part of the United States for the purpose of visiting dealers, particularly those located along the Pacific coast.

Tudhope's $50,000 Building—The Tudhope Motor Car Company is putting up a $50,000 building in Vancouver, B. C. The new structure will be a combined show room, garage and machine shop. It will cover an area of 75 feet by 125 feet at the corner of Fifteenth avenue and Granville street. It will be two stories high, of concrete construction.

Atkinson Severs Connections—C. J. Atkinson, inventor and patentee of the Atkinson gas producers, has severed his connection with the Dornfeld-Kunert Company. Watertown, Wis. Mr. Atkinson's services and the use of all his patents have been secured by Fairbanks, Morse & Company, Chicago, Ill.

Centaur in Larger Quarters—The Centaur Motor Company, Chicago, Ill., distributers of the Abbott-Detroit line of automobiles, will shortly take possession of the new premises located at 2246 and 2248 Michigan avenue, Chicago, Ill. The new building has a frontage of 40 feet on Michigan avenue and extends back 170 feet, and is three stories high. It will be completely equipped.

France Buying Our Cars—In the past 10 months the value of French imports of American machines has been $340,000 in excess of the total value of the imports of the 10 months of the preceding year. At the same time, so far from losing ground on this side, French makers of automobiles de luxe have doubled their exports to America during the present year, the total up to October 31 representing a value of $800,000.

Ontario's Revenue Doubled—Ontario's revenue last year from the sale of licenses for motor vehicles totaled $50,831.25, twice the amount received during the year 1910, which was $24,394. The revenue for 1906, the first year fees were imposed, was only $15,235.15. The licenses issued last year totaled 11,339, and for 1910, 4,320, while in 1906, 1,176 licenses were issued. Fees collected for issuing charters to automobile corporations totaled $235,663.10.

Baltimore Show in February—The Baltimore, Md., show will be held this winter from February 18 to 22 inclusive. The

Automobile Incorporations

AUTOMOBILES AND PARTS

BUFFALO, N. Y.—Empire Radiator Company; capital, $1,000,000; to manufacture automobile radiators. Incorporators: E. B. Green, W. S. Wicks, C. J. Ellis.

CHAGRIN FALLS, O.—Falls Garage Company; capital, $100,000; to manufacture and deal in automobiles. Incorporators: O. S. Gore, T. O. Waite, H. D. Bishop, T. H. Huggett, A. E. Huggett.

CLEBURNE, TEX.—Cleburne Motor Car Manufacturing Company; capital, $10,000; to manufacture automobiles. Incorporator: H. E. Luck.

COLONIAL BEACH, VA.—Colonial Beach Motor Company; capital, $5,000; to manufacture automobiles. Incorporators: F. W. Alexander, George Staples, H. W. B. Williams.

CHICAGO, ILL.—Edgar Motor Delivery; capital, $10,000; to manufacture automobiles. Incorporators: J. Edgar, E. A. Zimmerman, Abram L. Meyers.

CHICAGO, ILL.—Molliter Tire Company; capital, $100,000; to manufacture automobiles. Incorporators: Benjamin S. Lippincott, Bion D. Towne, William J. Higgins.

DETROIT, MICH.—Kessler-Detroit Motor Car Company; capital, $10,000; to manufacture automobiles.

FINDLAY, O.—Northway Motor Company; capital, $600,000; to manufacture motors. Incorporator: R. F. Northway.

INDIANAPOLIS, IND.—Tone Car Company; capital, $200,000; to manufacture automobiles. Incorporators: M. H. Miller, William P. Kirk.

LAGRANGE, GA.—J. F. Carley; capital; to engage in automobile business. Incorporator: John F. Carley.

MORGANTOWN, W. VA.—Colonial Motor Car Company; capital, $10,000; to deal in automobiles. Incorporators: A. A. Exley, W. E. Graham, J. H. Wolfe.

NEWCASTLE, IND.—Rose City Auto Company; capital, $10,000; to manufacture automobiles. Incorporators: F. E. Smith, C. W. Moucn, W. F. Byrket, H. M. Van Matre, G. Cameron, L. W. Bailey, A. D. Ogborn.

NEW YORK CITY.—American Commer Truck; capital, $10,000; to manufacture automobiles. Incorporators: R. C. Thompson, Julius Jagn, E. Thomas.

NEW YORK CITY.—Gilbert-Fulton Corporation; capital, $1,000; to deal in automobiles. Incorporators: G. J. Gilbert, Otto Gilbert, D. J. Fulton.

NEW YORK CITY.—Kell Motor-Radiator Corporation; capital, $650,000; to manufacture radiators for automobiles. Incorporators: H. A. Bingham, A. F. Garbe, C. A. Cole.

NEW YORK CITY.—Universal Auto Appliance and Construction Company; capital, $5,000; to manufacture motors. Incorporators: F. W. Darnstaedt, M. J. Lelerc, H. B. Tucker.

NIAGARA FALLS, N. Y.—Niagara Motor Car Corporation; capital, $10,000; to manufacture automobiles. Incorporators: C. E. Cromley, D. M. Hepburn, L. S. Hepburn.

RICHWOOD, O.—Scharf Gearless Motor Car Company; capital, $5,000; to manufacture and deal in automobiles. Incorporators: G. W. Worden, J. A. Scharf, W. H. Siples, H. E. Payne, L. J. McCoy.

ST. JOHN, N. B.—Maritime Motor Car Company; capital, $250,000; to manufacture automobiles.

SOUTH BEND, IND.—South Bend Motor Car Works; capital, $10,000; to manufacture automobile parts. Incorporators: J. D. J. Farneman, A. C. Mecklenburg, Hilton Hammond.

show will be combined, the pleasure and commercial cars to be shown at the same time. The show will be under the auspices of the Automobile Club of Maryland and the Baltimore Automobile Dealers' Association as heretofore. Application has been made by the joint committee of these two organizations for the use again of the Fifth Regiment Armory.

St. Paul's Ambulance—The city hospital, St. Paul, Minn., has ordered a Studebaker 30 emergency ambulance. The chassis is a stock model.

Hood Sales Manager—Wallace Hood has been appointed sales manager with supervision of advertising of the Westcott Motor Car Company, Richmond, Ind.

Davis Resigns—G. M. Davis, advertising manager of the Pierce Arrow Motor Car Company, Buffalo, N. Y., has resigned and will engage in newspaper work.

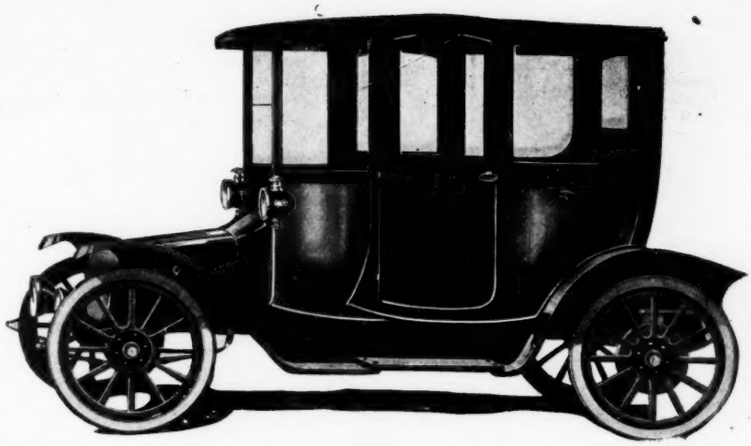
Sullivan Alco Manager—G. L. Sullivan has been appointed manager of the Chicago, Ill., branch of the American Locomotive Company, succeeding B. C. Day, resigned.

Alco in San Diego—The Los Angeles Alco Motor Sales Company, Los Angeles, Cal., southern California agents for Alco cars and trucks, has established a branch in San Diego, Cal.

Fort Dodge Show Plans—The second annual northern Iowa automobile show under the auspices of the Fort Dodge Dealers' Association is to be held at the Armory February 26 to March 1.

Brooks with Coach Builders—Emerson Brooks has purchased an interest in Burr & Company, coach builders, in New York City, and will devote his energy to the sales and repair departments.

Remy's Minneapolis Branch—The Remy Electric Company will open a branch in Minneapolis, Minn., January 1



New model with forward drive, manufactured by the Chicago Electric Car Company

and Gerald Fitzgerald, assistant manager at Chicago, Ill., is to be made manager.

Electric Starter for Henderson—In addition to the wire wheel equipment of the Riley type with which the Henderson company is going to fit its cars in the spring, an electric starter will be a part of the equipment.

Republic Rubber's New Home—The Republic Rubber Company, Minneapolis, Minn., will have a home in the new Murphy automobile building at Thirteenth street and Hennepin avenue, which is now constructed as far as the street level.

Milwaukee's Good Roads—More than 350,000 tons of asphalt were laid on the streets of Milwaukee, Wis., during the season of 1912, according to the report of the commissioner of public works, and next year it is planned to increase this by 50 per cent.

Milwaukee Automobile Stealing—The theft of five cars in Milwaukee, Wis., in eight days has caused a renewal of the agitation for a state law which will place automobile stealing on the same plane as horse stealing.

Contemplates Fire Truck Purchase—The Delaware Fire Company, Wilmington, Del., one of the fire companies contracting with that city annually for fire service, contemplates the purchase of a motor fire truck and has appointed a committee to look into the merits of the different makes.

Chauffeurs Receive Increase—Chauffeurs in the St. Paul, Minn., fire department have received an increase in their pay from $85 to $100 and the assistants will receive $85. The positions of drivers of motor apparatus will be open to competent men outside as well as inside the department.

Coffin in Southern Run—H. E. Coffin, vice-president of the Hudson Motor Car Company, Detroit, Mich., was one of the participants in the Thanksgiving run of the Savannah Automobile Club to the Lawyers' Club in Liberty County. Thirty-five cars participated in the run. The purpose of the run was to boost the good roads movement over the counties traversed.

Should Have Been Phosphor—A typographical error caused the word sulphur to be substituted for phosphor in the brief outline of the paper on Copper Alloys for Motor Car Service read by W. H. Barr before the Detroit section of the S. A. E. as given in THE AUTOMOBILE for November 14. It is obvious that sulphur does not have a beneficial effect on bronze as stated.

Des Moines Show in March—The fourth annual show of the Des Moines Automobile Dealers Association, Des Moines, Iowa, will be a two weeks' exhibition, the first week being devoted to pleasure cars and the second to commercial cars. March 3 to 8 will be given over to the pleasure cars. This will be the first time that a complete commercial show has been attempted in Iowa.

Three Wheel Electric Truck—To take the place of a number of two-horse tip carts which it operates, the Third Avenue Railway Company, New York City, has developed a novel type of electric truck. This has but three road wheels, the single one in the front having an electric motor contained within it. The large steel-tired rear wheels and body of the horse tip cart are retained and a heavy frame from which the batteries are suspended and a steering gear complete the new truck. It can be turned around in its own length.

Automobile Incorporations

GARAGES AND ACCESSORIES

AMSTERDAM, N. Y.—J. E. Larrabee Company; capital, $100,000; to deal in all kinds of automobiles and supplies. Incorporators: L. L. Larrabee, W. W. Leavenworth, K. L. Larrabee.

BUFFALO, N. Y.—American Kushion Kore Tire Company; capital, $10,000. Incorporators: K. E. Wilhelm, C. M. Baldy, C. H. Taylor.

BUFFALO, N. Y.—Buffalo and Interurban Motor Delivery Company; capital, $125,000; to carry on a general automobile delivery. Incorporators: J. G. Berner, C. T. Horton, W. D. Grandison.

DAYTONA, FLA.—Daytona Auto Supply Company; capital, $1,000; to engage in garage business. Incorporator: A. G. Hunt.

EVANSTON, ILL.—Penn. Oil Company; capital, $2,500; dealing in oil and supplies. Incorporators: J. M. Maddle, L. Ladole, L. B. Davis.

GREENSBORO, N. C.—Reitzel Auto Service Company; capital, $25,000; to carry on garage. Incorporators: J. H. Reitzel, O. C. Klingman, L. G. Klingman.

INDIANAPOLIS, IND.—Miller Carbureter Company; capital, $200,000; to manufacture carbureters. Incorporators: F. C. Fairbanks, R. M. Fairbanks, L. H. Colvin, O. L. Snyder, N. M. Doyle.

KENTVILLE, N. S.—Provincial Motor Car Company; capital, $50,000; to carry on a garage business. Incorporators: R. E. Harris, J. J. Porter, G. N. Reagh, R. J. Shaffner.

NATCHITOCHES, LA.—Natchitoches Livery & Garage Company; capital, $10,000. Incorporators: M. Aaron, J. B. Presburgm.

NEW YORK CITY.—Bradhurst Garage Company; capital, $5,000; to carry on a general garage business. Incorporators: J. C. Jackson, P. R. Gorden.

NEW YORK CITY.—Foreign & Domestic Automobile Repair Company; capital, $10,000; to repair automobiles. Incorporators: L. O. Rothschild, Otto A. Deffan, Max Kaplan.

NEW YORK CITY.—Motor Hauling Corporation; capital, $5,000; to do automobile trucking. Incorporators: W. G. McGrath, M. B. Sentner, S. B. Kerr.

NEW YORK CITY.—Rector Engine Corporation; capital, $150,000; to manufacture motors. Incorporators: Edward Gore, William Magowan, S. C. Yeaton.

PHILADELPHIA, PA.—Auto Safety Signal Lamp Company; capital, $100,000; to manufacture a safety signal device. Incorporators: L. Abeles, J. J. Drew, J. G. Gray.

QUEENS, N. Y.—Elmhurst Garage; capital, $5,000; to carry on a garage business. Incorporators: T. G. Smith, P. J. Testan, Millie Testan.

ST. PETERSBURG, FLA.—Ramm's Garage; capital, $100,000; to engage in garage business. Incorporator: F. W. Ramm.

WASHINGTON, D. C.—J. B. Bayne; capital, $4,000; to engage in garage business. Incorporator: Clarke Waggaman.

CHANGES OF NAME

AKRON, O.—Ideal Commercial Car Company; change of name to the Akron Motor Car & Truck Company.

ST. PAUL, MINN.—Electric Manufacturing Company; increase of capital to $50,000.

ST. LOUIS, MO.—Meuhling Motor Car Company; capital, $15,000; to conduct an automobile repair plant.

McCormick Power Spark Plug; Ackerman Two-Pane Windshield; American Auxiliary Air Valve; Gray & Davis Starter for National Cars; Emergency Fuel Tank Gauge; Triplex Gas Saver

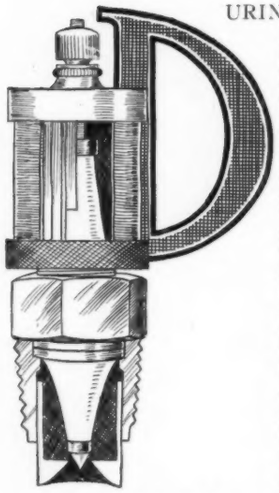


Fig. 1—McCormick power spark-plug

DURING the past year many developments have been made in spark-plug design and construction. One of the plugs involving a number of novel ideas is the McCormick power spark-plug, Fig. 1, which is distinguished by the use of a porcelain, the lower part of which is shaped as a cone and contained in a chamber serving as primary ignition space, of an electrode construction which produces a spark traveling around the positive sparking point and a condenser inclosed in a steel-case and effecting a stronger spark than would be obtained without its use. The illustration shows these several features, part of the shell and the steel-case being cut away for this purpose. The principal part which distinguishes this plug from others is the condenser which is interposed between the binding post terminal and the firing point. The latter, shaped as shown in Fig. 1, is covered by the porcelain insulation, against the lower end of which seats the flat flange of the conical point. This point is located centrally within the ring-shaped negative electrode, consisting of a sleeve which fits into the inner face of the shell. The spark always occurring at the coolest points is formed alternately at various places around the circumference of the shell, so that it travels, so to speak, around the positive electrode and does not permit the formation of soot and oil deposits on the plug. The effect of the space above the sparking point is that mixture is compressed in it during the compression stroke, and is ignited quickly all over. It is claimed that by the combined effect of the various features of this plug its working efficiency is materially increased, resulting in the production of a very powerful spark, which again helps to produce perfect combustion. The plug is made by the McCormick Manufacturing Company, Dayton, O., in the standard sizes, so that it may be fitted in place of any other spark-plug which it is desired to replace in an automobile motor. All McCormick spark-plugs are made standard and with interchangeable parts.

Fig. 2—Ackerman windshield. Fig. 3—American compensating valve

Matchless Pocket Lighting Device

The pocket lighter, Fig. 7, called the Matchless, is made by the Schiller Manufacturing Company, Chicago, Ill., for the lighting of acetylene and oil lamps on automobiles without the use of matches. The lighter is hardly 5 inches long and fitted with a clip so that it may be carried in the pocket like a fountain pen. It consists of a long, hollow piece into which fits a cap carrying a steel rod which has an alloy-steel point. The latter is surrounded by a wick. In practice the long piece is filled to about half its capacity with gasoline or alcohol, so that the wick is always soaked with the fuel. To produce a flame the cap and rod are pulled out of the hollow piece and the end of the rod is struck against the knurled piece of steel attached to the long piece, whereby a series of sparks is made which ignite the alcohol or gasoline with which the wick is soaked. A small but strong flame is thus obtained which is not easily extinguished by wind.

Emergency Gasoline Tank Gauge

The gasoline gauge shown in Fig. 6 is made by the Emergency Novelty Company, Port Huron, Mich., and is equally adaptable for gravity and pressure-feed systems. The gauge is attached and connected to the tank C by means of a coupling F inserted into the gasoline line leading to the carbureter and a pipe G providing a communication between the upper portion of the tank and the upper space in the gauge vessel. The latter is a glass tube, the upper and lower end of which is closed by a check valve opening downwardly. B is the lower valve which separates the gasoline in the tank from that in the gauge, and A is a pushbutton which may be pressed down. If this is done, the air pressures in gauge and tank equalize through the pipe G, and the gasoline in the gauge assumes the same level as in the tank, so that the amount of fuel contained in the latter may be read easily on the scale attached to the gauge glass. If the glass is broken, only the gasoline in the gauge tube is spilled, while the contents of the tanks is kept from flowing out by the valve B, which is pressed against its seat formed at the bottom of the gauge, by a spring. The gauge scale may, of course, be adapted to fit any type or design of gasoline tank, making the gauge applicable to any automobile.

Edelmann Tire Chuck and Gauge

E. Edelmann & Company, 229 West Illinois street, Chicago, Ill., have added another tire specialty to their line of accessories. This is the inflating chuck, Fig. 6, which is an entirely automatic device. It is simply a coupling built up on a right-angled air lead, one arm being formed with a ratchet surface over which the hose is slipped while the other fits over the tire valve, being pressed on it to make an airtight joint. When the tire is fully inflated, the air chuck is pulled off the valve, which is thereby shut automatically. Fitted in the chuck is a tire gauge of the ordinary Edelmann design, which at all times indicates the pressure obtaining in the tube.

American Compensating Valve

A sensitive compensating valve for multi-cylinder engines is seen in Fig. 3; it is said to give more perfect combustion at high speeds than can be obtained without it. The valve consists of a truncated cone in which a number of spring-controlled check valves are mounted and which is attached to the air inlet of the carbureter. Fig. 3 shows the valve mounted on the air inlet of a Schebler carbureter. The valve is shown at A, being mounted

in place of a plate which normally closes the pipe, which is bored at B for the normal air admission. The air opening B is fixed and supplies the motor at low speeds, wherefore the needle valve C must be adjusted to give the right mixture under these conditions. As the motor speeds up with the throttle opened wider, the auxiliary compensating valve supplies the necessary air, one check valve opening first, the others after, in response to the increasing vacuum in the cylinders. The design of compensating valves varies for the various types of carbureters, but the American Compensating Valve Company, Manitowoc, Wis., makes designs to fit every type of carbureter now on the American market.

Ackerman Ventilating Windshield

Joseph N. Smith & Company, Detroit, Mich., manufacture a two-piece type of windshield which permits of a variety of positions of its panes and consequently gives a variable effect. Fig. 2 shows the shield in such a position that the upper shield deflects the wind so that it passes over the head of the driver, while the lower pane, being turned in, ventilates the lower space in front of him. The upper pane may be turned completely around the axis formed by the two points at which it is secured to the frame of the lower pane. The joints are so constructed as to be proof against rattling. The shields may be had with black enamel, brass or nickel finish, or a black enameled frame with brass or nickel mounting.

Bremer-Wilson Gasoline Saver

Under the name Triplex Gas Saver, the Bremer-Wilson Manufacturing Company, 1256 Michigan avenue, Chicago, Ill., sells a small and effective device which is designed for the breaking up of liquid fuel globules getting past the throttle. To obtain perfect atomization of the fuel, the mixture is forced, on its way from the carbureter to the motor, through a fine, triple screen of wire gauze which is held in a brass frame shaped as the device in Fig. 8. A part of the brass frame on each side is formed en relief, so as to fit between the carbureter and manifold flanges, to which it is bolted. The opening in the gas saver is equal in diameter to the size of the carbureter; the thickness of the device is about .5 inch, so that the only difference made by the installation of the saver on the engine is that the carbureter is placed so much lower, as compared with its original position. The trouble of installing the device is very small, and the result of better atomization of the fuel inevitable.

National Car's Self-Starter

The Gray & Davis starter used on the cars of the National Motor Vehicle Company, Indianapolis, Ind., operates in conjunction with the lighting generator, the latter being of the constant-speed type. This generator construction is used to obtain a current output at constant voltage, a slipping clutch being used between the driving member and the generator shaft itself. The current is fed to the battery which floats on the line of the lamps. The motor which serves for starting is actuated by the current from the battery; it is so connected to the engine that the pressure on a pedal both closes the circuit which energizes the field of the motor and throws the motor shaft in gear with the crankshaft. As soon as the engine speeds up sufficiently, the starting motor is automatically thrown out of gear with the engine, and the circuit is interrupted, whereupon the dynamo generator begins to recharge the battery. The battery used in the National equipment is of sufficient capacity to furnish current for the lights for several hours.

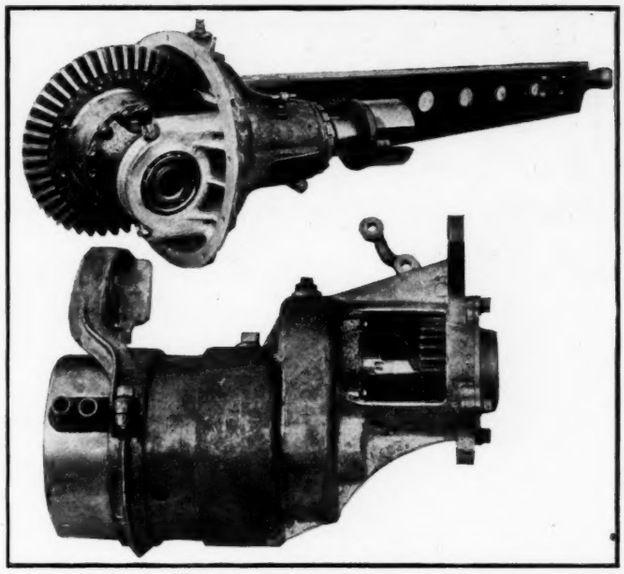


Fig. 4—Gray & Davis electric starter of National automobiles

Wolf Automobile Fuel Mixer

The mixer of A. M. Wolf, 146 East Eighty-first street, New York, is a device of one-piece construction which fits between the carbureter and the intake pipe. It consists, in principle, of an open sheet-metal cylinder, the lower end of which carries a horizontal flange, and the wall of which has been cut along its entire height, at two places diametrically opposite to each other. Two of the four edges thereby produced are bent inwardly under an incline of about 50 degrees, thereby forming two inclined surfaces in the mixture passage, which have an effect somewhat akin to that of a screw, resulting in a whirling motion set up in the mixture traveling toward the inlet manifold. This whirling motion, in turn, brings the particles of the mixture in very intimate contact and causes whatever liquid parts are carried along in it to be broken up and thus prepared for efficient combustion.

Lubro Anti-Freezing Compound

The Lubro Oil Company, Cleveland, O., has manufactured an anti-freezing fluid, which is red in color, harmless in action and is claimed to prevent the radiator water from freezing even in the coldest weather. In practice 1 volume of Lubro is used to 2.5 volumes of water.

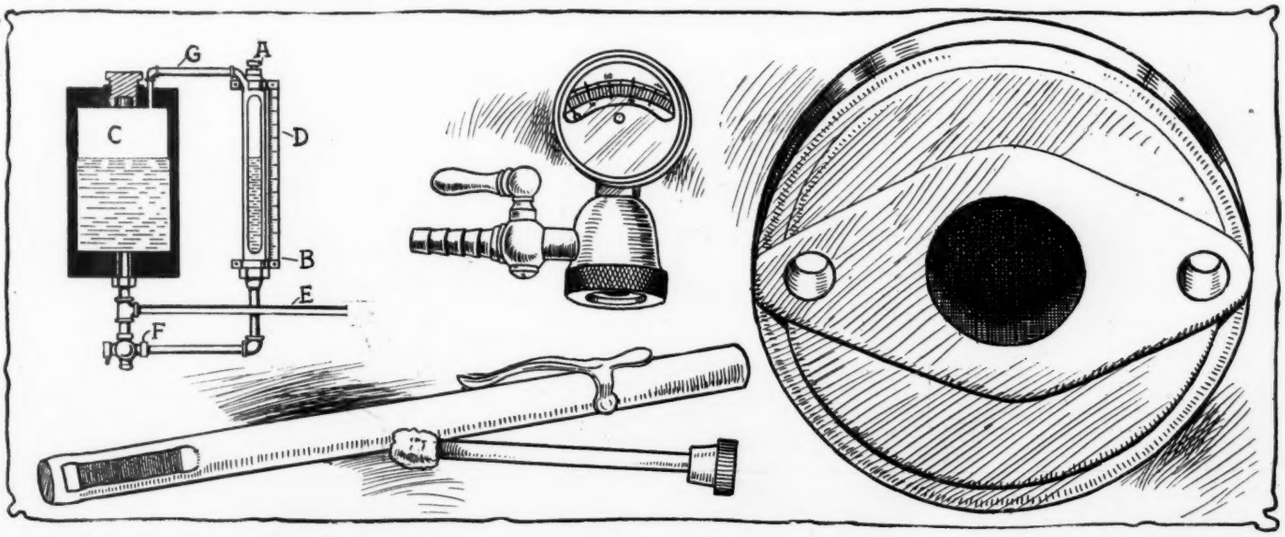


Fig. 5—Emergency fuel gauge. Fig. 6—Edelmann inflation chuck. Fig. 7—Matchless pocket lighter. Fig. 8—Triplex gas saver

Patents Gone to Issue

AUTOMOBILE Engine Carbureter—In which the walls of the mixture chamber are contractible for the purpose of throttling.

This patent refers to a carbureter, Fig. 1, the body of which is formed with parallel sides and has at its upper end a discharge port M for mixture. Into this body a pair of opposed, inwardly curved, plates P are fitted, being hinged at their lower ends H and forming a flanged port just below M. Between the inwardly curved portions of plates P, a fuel jet is provided which communicates with a float-chamber regulating the supply of fuel. The plates P form a mixing chamber above the jet and an air chamber below it, these chambers being adjustable, due to the movability of the plates P. An air valve for regulating the amount of air admitted into the carbureter is provided by two plates Q depending downwardly from the lower ends of P. A mechanism A permits of simultaneously actuating the plates P and Q, thereby regulating the amount of air admitted to the carbureter and maintaining a fixed ratio between capacities of the throttle and the air inlet.

No. 1,045,613—to Harris C. Roth, Chicago, Ill. Granted November 26, 1912; filed July 29, 1911.

Rotary Valve Design—A sleeve which is positioned between the cylinder wall and the head.

The valve design which is the subject matter of this patent, is shown in Fig. 2. This figure shows a cylinder C which is formed with a concentric head H secured in the top end of C and made with a somewhat lesser diameter. Thereby an annular cavity between the cylinder and the head is formed in which a sleeve valve V is in place. The ports are formed on one side of each cylinder and the manifolds are so constructed that one inlet pipe serves the twin inlet ports P of two adjacent cylinders, while the outlet ports Q are served by separate manifold leads. By means of gearing G the sleeve valves are operated at suitable speeds through the movement of the cylinder pistons.

No. 1,045,500—to Edward H. Belden, assignor to Belden Engineering Company, Pittsburgh, Pa. Granted November 26, 1912; filed December 26, 1911.

Autogenous Welding Torch—Comprising separate inlet conduits for oxygen and a fuel gas, and a capillary connection between them.

The welding torch referred to in this patent consists of a head H, Fig. 4, which is made of one integral block of heat-resisting material and formed with conduits C1 and C2, for a combustible gas and for oxygen respectively. The conduits into the head are separate; C1 opens directly into a passage forming an orifice O in the removable tip T of the torch, while C2 communicates through the bore B with that passage. The bore B intersects C1 at a practically right angle, so that the gases meet before entering the tip.

No. 1,045,506—to Worthy C. Buckham, assignor to Davis-Bournonville Company, New York City. Granted, November 26, 1912; filed February 27, 1912.

Automobile Motor Lubrication—Being a connection between crank and flywheel chamber.

This patent relates to a lubricating scheme, Fig. 5, which comprises a flywheel F housed in an annular enlargement E of the crankcase C. In the lower portion of E is an oil chamber O in which part of the flywheel is immersed; an oil-receiving pocket P1 is formed adjacent the top of E, while the lower portion of it has a transparent panel P. Centrifugal action sends oil into P1, whence it returns to C.

No. 1,045,772—to Howard E. Coffin, Detroit, Mich. Granted November 25, 1912; filed April 13, 1908.

Automobile Muffler—Combining the action of tortuous passages and baffling plates.

The muffler described in this patent comprises a casing C having a head H formed with a flange F. An inlet pipe I closed at the outer end by a perforated plate supplies the interior of the muffler with exhaust gases. The latter pass out of the pipe through other perforations therein, formed close to the cap C which closes its inner end. Baffle plates B mounted on rods R, which hold the muffler together, offer further resistance to the gases, which leave through the funicular discharge D.

No. 1,045,614—to John H. Sames, Galion, O. Granted, November 26, 1912; filed April 16, 1912.

Electric Automobile Signal—Comprising a diaphragm and a vibrating armature.

This patent relates to an electric horn construction which includes a hollow body to the front wall of which a resonator is attached communicating with the interior of the body portion. To the latter a diaphragm is removably attached and it forms a chamber between it and the front wall of the body portion above mentioned. Electro-magnets are secured adjustably to the body portion, being out of contact with the vibrating portion of the diaphragm. An insulating disk is supported by the magnets and an arm mounted on the disk, as well as an armature resiliently secured to it. This armature is so constructed that when the current is closed it makes intermittent contact with the arm mentioned above.

No. 1,045,706—to Martin E. Hepburn, Elgin, Ill. Granted November 26, 1912; filed October 26, 1911.

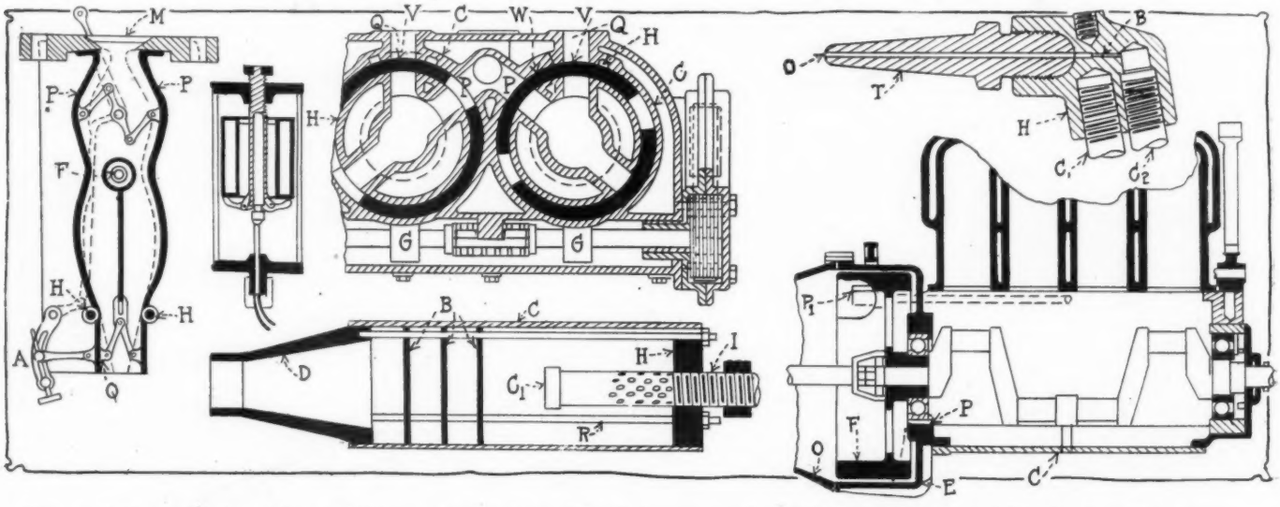


Fig. 1—Roth carbureter. Fig. 2—Belden rotary valve. Fig. 3—Sames muffler. Fig. 4—Buckham welding torch. Fig. 5—Coffin oiling system